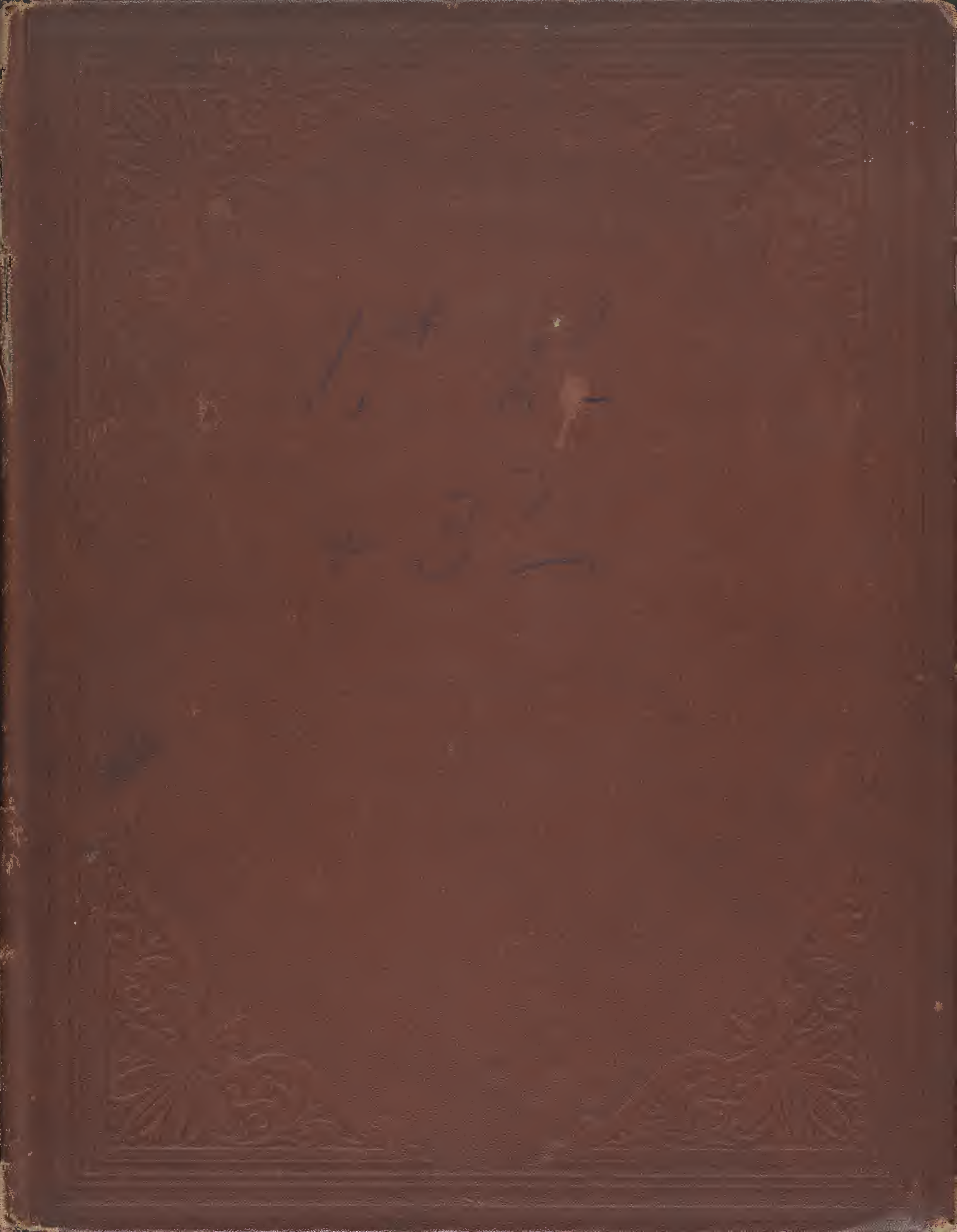

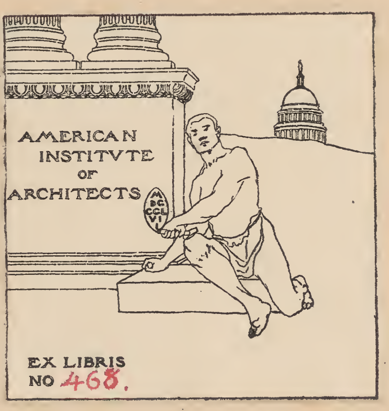
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Proceedings 1st 2d + 3d Conventions

Including following papers

Fire-Proof Floors. By R. G. Hatfield – Feb. '68

Remarks on Fire-Proof Construction. By P. B. Wight – April '69

Architectural and Other Art Societies of Europe. By A. J. Bloor – Feb. '69

In addition to which has been inserted –

Technical Proposition By D. T. Atwood, 4th Convention, Nov. '70

AIA Rec Ser 505 – (1-3)

American Institute of Architects.

PROCEEDINGS

OF THE

ANNUAL CONVENTION

OF THE

American Institute of Architects,

HELD AT THE ROOMS OF

THE NEW YORK CHAPTER.

October 22d and 23d, 1867.

New York:
RAYMOND & CAULON, PRINTERS, 88 CEDAR STREET.

1867.

AT the close of the Session of the Annual Convention of the A. I. A., held at the Rooms of the New York Chapter, No. 42 East 14th Street, on the evening of October 23d, 1867, the following Resolution was passed: "That all Papers and Reports read in the Convention, together with the Minutes of its Proceedings, be referred to the Committee on Library and Publications, for publication." And at a meeting of the Committee on Library and Publications, held the following morning, it was "RESOLVED, That one thousand copies of the Proceedings of the Annual Convention—just adjourned—of the Institute be published, including all the Reports presented, with such omissions as may be thought proper, and with the addition of such other matter, apart from the Proceedings, as may be judged relevant, and necessary for a complete and useful vehicle of information and enlightenment; and that the preparation of the matter for publication be referred to the Secretary, subject to the sanction of the Committee."

P. B. WIGHT, *Chairman, pro tem.*,
ALFRED J. BLOOR, *Secretary*,
COM. ON LIB. AND PUB., A. I. A.

MINUTES

OF THE

Annual Convention of the American Institute of Architects,

Adjourned from October 8th, and held at the Rooms of the New York Chapter, A. I. A.
No. 42 East 14th Street, New York, October 22d and 23d, 1867.

First Session.

* * * * * *

Tuesday, October 22d, 3 o'clock, P. M.

Richard Upjohn in the Chair, F. C. Withers, Secretary.

The President read his Annual Address.

After the Roll was called, the Annual Report of the Board of Trustees was read by the Secretary and *accepted.*

The Annual Report of the Treasurer was then read by Mr. R. G. Hatfield, Treasurer, and *accepted.*

On motion, it was *Resolved* that the Chair appoint a Committee to audit the Treasurer's accounts; whereupon the President appointed Messrs. George B. Post, P. B. Wight and Wm. T. Hallett for said Committee.

The Report of the Committee on Examinations was then read by Mr. Dudley, Secretary of that Committee, and *accepted.*

The Report of the Committee on Education was then read by Mr. R. G. Hatfield, and *accepted.*

The Report of the Committee on Library and Publications was then partially read by Mr. P. B. Wight, Chairman *pro tem.* of that Committee, when

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it was, on motion of Mr. Post,

Resolved, That the Convention proceed at once to the business of electing new members.

The Chair then appointed Messrs. Lienau and Gambrill as Tellers, who, after balloting, reported the following gentlemen elected:

J. C. Markham, Hudson City, N. J., Fellow.
D. T. Atwood, New York, Fellow.
Carl Pfeiffer, New York, Associate.
H. H. Richardson. New York, advanced to the grade of Fellow.

On motion, the meeting adjourned to 8 o'clock, P. M.

Second Session.

* * * * * *

Tuesday, October 22d, 8 o'clock P. M.

Richard Upjohn in the Chair, F. C. Withers, Secretary.

Mr. Wight finished the reading of the Report of the Committee on Library and Publications, which was *accepted.*

The election of Officers and others for the ensuing year, as per By-Law IV, was then entered upon, and a Nominating Committee was, by *Resolution*, appointed by the Chair, consisting of Messrs. O. P. Hatfield, Post and Gambrill.

Pending the election, Mr. EMLEN T. LITTELL gave notice that he desired to resign his position on the Committee on Education, giving his reasons for his decision, whereupon Mr. LITTELL's resignation was *accepted.*

On *Resolution*, the Chair appointed Messrs. VAN BRUNT and R. M. UPJOHN, Tellers, who, after balloting, reported the election of the following Officers:

President, RICHARD UPJOHN.
Treasurer, R. G. HATFIELD.
Secretary, F. C. WITHERS.
Corresponding Secretary, W. R. WARE.
Librarian, A. J. BLOOR.
Board of Trustees, D. LIENAU, re-elected.
Committee on Examinations, R. G. HATFIELD, re-elected.
Committee on Education, W. R. WARE, re-elected, and A. GILMAN, to fill vacancy.
Committee on Library and Publications, E. T. LITTELL, to fill vacancy.

The Report of the New York Chapter was then read by Mr. A. J. BLOOR, Secretary of the Chapter, and *accepted.*

The Auditing Committee on the Treasurer's accounts reported that they had examined the same and found them correct.

The Convention being informed that the Institute had received a communication from a Committee representing an association of Boston Architects, the Secretary was instructed to read it.

After being read, the said communication was, by *Resolution*, ordered to be taken up for consideration.

On motion, a Committee of three was appointed by the Chair, to consider the same, consisting of Messrs. POST, R. G. HATFIELD and BLOOR.

Mr. LIENAU moved that the meeting reconsider the subject.

On motion of Mr. LITTELL, the Institute, for the full discussion of the subject, then went into Committee of the Whole.

Mr. UPJOHN having vacated the Chair, Mr. R. G. HATFIELD was, by acclamation, placed in it as Chairman of the Committee of the Whole.

After the Committee had risen and Mr. UPJOHN had resumed the Chair, the Chairman of the Committee reported its proceedings, and offered the following resolution which was adopted.

Resolved, That a Committee to consist of Messrs. GILMAN, GAMBRILL and the Secretary, be appointed to express to the Society of Boston Architects the gratification of the Institute in the establishment of their association for purposes of professional advancement, and to enquire what difficulties, if any, may be in the way of their forming a Boston Chapter of the American Institute of Architects.

The meeting then adjourned to the following evening, at 8 o'clock.

Third Session.

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Wednesday, October 23d, 1867, 8 *o'clock P. M.*

RICHARD UPJOHN in the Chair, F. C. WITHERS, Secretary.

The Chairman opened the Session by informing the meeting that the special business of the evening would be to consider the Reports of the various Standing Committees and of the New York Chapter.

The Report of the Committee on Examinations was then taken up for consideration.

A *Resolution* was passed that the recommendation, contained in the report, that the Institute take some measures by which the Building Law may be rendered more perfect in its operation, be referred to the Committee on Examinations, with power.

The Report of the Committee on Education was then taken up.

A *Resolution* was passed that the recommendation, relative to the formation of a Polytechnic School, be read. Mr. R. G. HATFIELD accordingly read the recommendation, viz.: that measures be at once taken by the Institute to carry the suggestions contained in the Report into effect, and that an active canvass be immediately instituted to procure the indicated endowment necessary for its initiation and maintenance.

After considerable debate, a motion was made that the Institute adopt the recommendation of the Committee on Education for the establishment of a Polytechnic School.

Mr. POST moved as a substitute, that the Committee on Library and Publications be instructed to print the Report of the Committee on Education, and to send a copy to each member of the Institute, and that when the Committee on Education consider that the proper time has arrived for definite action on the subject, they request the Board of Trustees to call a special meeting of the Institute for that purpose. The substitute was put to the vote and *adopted.*

The Report of the Committee on Library and Publications was next taken up for consideration, and elicited prolonged discussion.

It was moved, on the recommendation of the Committee, that the Schedule of Professional Charges of the Royal Institute of British Architects be adopted by the American Institute of Architects, but the motion was withdrawn, and a *Resolution* passed that the subject be referred to the consideration of the Board of Trustees, with power.

A long debate followed on the scheme, recommended by the Committee, for procuring a Library, indicating the preference of a majority of the Convention for the establishment of Chapter Libraries rather than of an Institute Library.

It was moved and seconded that the methods suggested by the Committee on Library and Publications for the enlargement of the Library of the Institute be adopted, and that the said Committee be instructed to take such measures as it may think best for the furtherance of the scheme. The motion was lost.

A substitute was afterwards offered and seconded, "That the Institute take measures to procure a Library in the manner suggested by the Committee on Library and Publications, and that the Library, when procured, be divided among the various Chapters in the proportion in which the funds procured for the Library shall, by each Chapter, be secured under the direction of the members of that Chapter." The motion was defeated.

On motion of Mr. Post, the following resolution was finally passed:

Resolved, That no funds be raised by the Institute, as a body, for the formation of a Library, but that all Chapter Libraries be catalogued as the Library of the Institute."

Referring to the suggestions of the Committee, in relation to Reading Rooms, Mr. Wight moved that the Board of Trustees be requested to appropriate the sum of fifty dollars ($50) *per annum* to each Chapter, to assist them in the formation of Reading Rooms. The motion was *Carried.*

* * * * * *

The Report of the New York Chapter was then taken up, and the attention of the Institute directed to the instance therein specified of the benefit arising to certain competing Architects in Philadelphia from the action of the New York Architects, in a question of competition.

A motion was made and *Carried* that all Papers and Reports read in the Convention, together with the Minutes of its Proceedings, be referred to the Committee on Library and Publications for publication.

On the suggestion of the President, seconded by Mr. Bloor, Mr. Fred. Law Olmsted was unanimously elected an Honorary Member of the Institute.

Mr. Gilman then read the Closing Address, "On the Relations of the Architectural Profession to the Public."

The following resolution was then carried:

Resolved, That the thanks of the meeting be given to Mr. Gilman, for his Address, and that it be referred to the Committee on Library and Publications for publication.

A resolution of adjournment was then passed, and the Convention adjourned.

FRED. C. WITHERS,

Secretary.

President's Address.

Gentlemen of the

American Institute of Architects:

It is now ten years since a few architects of this city convened for the purpose of considering the expediency of forming a society of members of their profession. It was held as a certainty that, thus united, architects would assist each other, by friendly intercourse, in the acquirement of every branch of professional knowledge necessary for the progress, either of the individual member, or of the proposed association, and our experience, as a society, has not disappointed us.

The civil war has intervened, deranging every branch of commercial and professional pursuit; but though a moiety of our existence as a body, has thus, as it were, been cut away, we feel that we are not too self-complacent in asserting that we have, by a discreet handling of the opportunities left us, accomplished for the profession and the public an amount of benefit which could in no way have been accomplished without our action. The reports of the New York Chapter and of the Standing Committees of the Institute, which will be read to you during this Convention, will recall to your minds some of the results of our labors, though they will hardly give an idea of the amount of time and care bestowed on the work, of which the recorded results are summed up in so few words. But the very consciousness of what we have accomplished incites us to do more, and we feel that very much remains to be done. We feel that it is highly important, nay, essential, to a large and tangible success, that there should be a liberal interchange of professional thought among us; we feel that the more we accustom ourselves to interchange our opinions and judgment, the more we shall set in motion friendly criticism, restricted by a just appreciation of the works of our fellows. Look at the work of other men as if it were not theirs, but yours; just stand in their shoes a while—to use a homely phrase—and then look at the results of their labors, and you may be certain, so standing, that you will do no harm to your neighbor. On the contrary, you will give him full credit for his skill and ability, and your criticism of his work will enlarge your own knowledge. You will also present to him new views and needed information, and he will be obliged to appreciate the sincerity of your attempts to do him professional service. In a word, he will be thankful. We complain, and sometimes justly, of the irrelevent, and to say the least, disreputable criticism of others. I say this because mere loose observations and remarks strike at the reputation of others, and sometimes do great and lasting injury to them. If we cannot speak in commendation of another's work, we will say nothing.

We are trying to enlarge the friendly interest we have already awakened, and, to a very considerable extent, established, during the past ten years of our existence as a body corporate. There is evidently, so far as our specialty is concerned, a spirit of enquiry throughout the United States. Letters are received and questions asked as to what we are doing and intend to do; and many are desirous of uniting with us. Thus far, then, we have much to encourage us in our undertaking. It is not necessary, perhaps, to remind you that our efforts to develop Architecture and its kindred sciences, are viewed by many of our fellow-citizens with increasing satisfaction. Non-professional men, men of leisure—and many of them men of ample means—only require to have our schedule of contemplated labors placed before them and explained, and they will meet us with a hearty cöoperation.

The first constitution of our association was drawn up to express the views and further the purposes of the Institute, laying down such rules and regulations as would lead to the realization of the same. It will be observed, on examination of the different articles of this constitution, that the Institute, in the outset of its career, had in view the benefits which its superior facilities might accomplish in matters connected with the planning, constructing and laying out of a city or cities. The Institute aimed at effecting a change for the better, wherever it was needed—the sole object of effecting such a change being the overthrow or the alteration, as speedily as circumstances and expediency might permit, of every habitation and building that should be found deficient in a sanitary or a moral view of the case.

Though the Institute is established for the pursuit and communication of such knowledge as is conducive to the development of Architecture, it will nevertheless, it is hoped, be a source of public improvement and reform, beyond the mere scientific and artistic limits of the pursuit, and thus be, in no slight degree, a helper of civilization.

In this view of our American Institute of Architects, we see it to be no mean contributor of good to our fellow-citizens. And it is the duty of every one of its members to throw the full force of his ability and influence, so far as the demands of his first duties towards himself and his dependents will permit, into the combined effort to make the Institute attain its object, and realize its noble ideal. If we do so, if we show that we respect our work, and ourselves as its doers ; that we know what we mean, and mean to do it, so far as our providential opportunities will permit; if we make what we have done apparent, and show that we have well laid out our plans for the future, and have the men, the intellect, and the culture to carry them out well, we shall find that Providence will not fail us, but will, through the medium of outside cöoperators, supply us, according to our needs and our progress, with the material means requisite to make our mental capital available.

Since our last Annual Convention, a radical change has been effected in the organization of our society, consisting in the constitutional provision for chapters in affiliation with the general and national objects of the Institute, while yet, for local affairs, under the government of their own laws. It is needless to say that the committee appointed to thus modify the Constitution, were selected with special reference to their well-known ability for the occasion, and that their earnest attention was devoted to the duty assigned to them. The votes cast, after prolonged deliberation within the Institute on the draft submitted by them, showed it to be the almost unanimous opinion of its members, that the proposed change was the best calculated—in the language of the second article of the Constitution—"to unite in "fellowship the architects of this continent, and to "combine their efforts, so as to promote the artistic, "scientific and practical efficiency of the profession." The feeling seemed to be unanimous that the sentiment of independence in local legislation was essential to the usefulness and dignity—and even to the self-preservation—of the various groups of practitioners in architecture at the great centres distant from New York ; while, at the same time, it seemed apparent that to make a truly national organization, and to cöordinate the activities of different localities for mutual benefit, and prevent counter-action, weakening to the whole body, and prejudicial to its interests, it was necessary that the ties between the new organizations and the parent one, should be strong and enduring. By the accident of the formation of the Institute in New York, it has hitherto held, as it does during the present Convention, its sessions in this city. But there is no reason why it should not be considered a peripatetic body, like most of the scientific corporations in this country and Europe, and become the guest, successively, of the contemplated local organizations in the various cities of the Union, as circumstances may dictate. The relations of the Institute and its Chapters are, in fact, similar to those of the National and State Governments of the Union; the Chapters being sovereign within their own limits, as to the *modus operandi* of their affairs, and the Institute holding the necessary coordinating power, subject to the will, constitutionally formulized at the annual conventions, of the Chapters themselves; while, at the same time, it represents, with centralized prestige, the collective Chapters in their international relations. That those international relations have already become reciprocally useful and important, we have evidence in the fact that the Institute received, some time since, an invitation to intercourse and fellowship from the President of the Royal Society of Portuguese Architects, and that, to quote from the letter issued some months since by our Librarian, in the call he was instructed to make for a further collection of photographs and other illustrative works of American Architects, "a gift of American Architectural Photographs, made some months since to the British Institute, was officially received and inspected by that body with great interest, followed by the expression of its desire to have further specimens of the same, and of its trust 'that they should always maintain that most intimate friendship with the Architects of America which had been so happily begun'—that the bearer of them, Mr. W. R. WARE, of Boston, as representing the American Institute, received a most cordial official reception from it—that the schedule of prices adopted by the A. I. A. was, by order of its (the British Institute's) Council, republished for the information of English Architects, and that the President of the A. I. A., Mr. UPJOHN, was elected one of its Honorary Members, and copies of its official proceedings and documents were transmitted to the A. I. A., accompanied with the promise that 'all future Transactions and Publications would follow those already voted,' so that, 'this (the British) Institute would be continually in communication with those across the Atlantic.'"

The British Institute afterwards transmitted to our Library copies of the record of its Transactions from the year 1842 up to last year—a highly interesting and useful addition to its too meagre stock of volumes.

In view of what I have said, and of the fact that the By-Laws of the Institute, and the Rules of Order for the Chapters, are the result of prolonged and conscientious study of the subject, under the guiding principle that no one Chapter should, by any possibility, participate in any benefit, to the exclusion of its fellow Chapters, as well as of the exhibit of the benefits that have already accrued to the common good, as set forth in the reports of the Standing Committees, which will presently be submitted to you—I can hardly doubt that the well-trained and responsible architects of the other great centres of our country will speedily organize themselves into Chapters in affiliation with our Institute, and thus secure to themselves and us the benefits and the success which follow the coördination and coöperation of similar forces.

It is not my purpose, in a general address of this nature, made in a corporate capacity, to give an *ex cathedrâ* utterance to individual opinions, or to anticipate the results of individual reflection and judgment on the part of others; but I feel as if I should not fully discharge my duty to my younger professional brethren, if, after my extensive opportunities and long experience, I should omit all allusion to a subject, the effects of the facts of which have, according to my observation, produced much evil, and only evil, to the profession. I allude to competition—general competition—a sorry subject for architects. It burns the fingers of those who meddle with it; it is a chronic infatuation, an *ignis fatuus*, a Will-o'-the-Wisp. It leads on the unwary to trust in the necessarily uneducated and uncertain judgment—so far as our speciality is concerned—of committees, the successes in life of whose members have, in nine cases out of ten, been gained in business pursuits, entirely out of the way of art, science, or mechanics. It blinds the competitors to every other work but their own, however weak that may be. This rushing pell-mell into the arena, to compete for the suspended prize, may be very pleasant to the lookers on, to the committee-men, and to those of the ring, who gather up the profits; but, at the final decision, when judgment has been passed and the prize is awarded, the competitors find themselves as full of aches and sores as a whipped prize-fighter, or a chronic invalid, just breathing and no more.

Now, my good friends, this species of infatuation, (I can call it by no better name), should be shunned. I pray you to let general competition alone. Avoid it as an unclean thing, which can produce only heart-burning and disappointment; and by abstaining, you will give it its death-blow. But while the public see us eager to give away our wits and culture, it will be a pastime to it to throw out the bait for our anxious souls to nibble at. And we shall get but nibbling, unless it be something worse.

Our time and our work are much too precious to be squandered in this manner. However, as it is expected that we should make a present of our professional experience for the benefit of the public, I, for one, have no objection to do so. But it must be done fairly, and under a system that will bear the most scrutinizing investigation. In fact, we must be honest in competition. This may be considered too plain—some may say, harsh; but if it be worth while to do a thing at all, it is worth while to do it well. You know that the great excellence in building is Truth. Truth in architecture, is Stability. Without it the building is a tottering sham. Let us act out this principle of Truth in our lives; for, unless we are rigidly faithful to it in our conduct, we shall find it difficult to embody it in our designs. For "a corrupt tree cannot bring forth good fruit." A mind full of deceit cannot make a truthful design. An irreligious mind cannot develop the idea of purity in its work. For the walls and pillars which we erect—what are they but the lithographing—the writing in stone—of our own conceptions? Therefore, as our ideas are, so will be the structure which we build. And the two ideas of purity and irreligion cannot have a home in the same mind. Neither can truth and deceit.

When the public understand that we are in earnest, and intend to abide by the rules of business which we have laid down, it will respect both the rules and their makers. In illustration of this, let me call your attention to an instance you will find cited in the report of the New York Chapter, showing that the record of the refusal of the New York architects to compete, on unremunerative terms, for the Post Office, resulted in a fair compensation being offered to professional architects in Philadelphia, for preliminary designs for a public building there. Would this have been the case if the New York protestors had shown themselves weak-kneed, and taken whatever pittance was thrown to them?

But to return. What has hitherto been the programme laid down by Building Committees of public structures, in their dealings with architects? Invariably this: Designs and plans are requested to be sent to the Chairman, who, with his coadjutors, are appointed to select, from such as may be forwarded to them, that design which, in their judgment, is best adapted to the purposes required. Now, if the Committee were capable of judging properly and wisely, and were all honest and disinterested, it would be all very well. But it is to be supposed that no one of the Committee is so well versed in architectural knowledge as any one of the competitors. How, then, is a wise selection to be made? Here are those who run the race, and their judges, brought face to face. The several works are laid out before the judges. Each design is explained and illustrated by its author, according to his ability. Now, to whose decision do these aspirants appeal for the award? To the Committee, of course. And who ordinarily compose the Committee? Gentlemen of great respectability, it may be, but of various intellectual capacity and culture, who have never devoted an hour to the study of the science of Architecture, and who know nothing of its forms and terminology. Not one of these committee-men, be it known, excellent gentlemen as they are in their daily walks, has sufficient knowledge of the business proper to say a word with a good understanding of the work before them. They cannot comprehend any single set of plans which embrace the principles of construction. All that is prëeminently fitting the purposes of the conception—all that is so well adapted to the site—all that is suited to the purpose of the structure—all that is æsthetic—what do they know of the business? Nothing sufficient to authorize any one of them to accept a place in the Committee on a matter of such weighty import as that of passing judgment on a building which is destined to hand down to posterity the mind and the intelligence of the people by whom it is erected, or to show their lamentable deficiency in taste. So much for the evils attending competition. Let us now endeavor to find a remedy which shall be satisfactory to the competitors and to the commission, and which shall be productive of more truthful work, and thus advance taste and culture.

The best way to remove the evils attending competition would probably be a resort to some such system as the following: Appoint five Commissioners, of good repute, and three non-competing architects, whose joint business shall be to make the award. The plans submitted for examination should be placed before the Commissioners and the architects jointly; and the architects, after a careful examination, by themselves, of each of the designs, should recommend to the Commission such plans as, in their judgment, they shall deem most worthy; their decision, of course, implying the nomination of the successful competitors. We ask to be judged by our peers.

Assuming that we have under consideration a work of national importance, the number of competitors should not exceed ten, nor be less than five. Each of the competitors should be paid a sum sufficient at least to remunerate him for his expenses. But it should be understood that the designs presented by each and every one of the competing parties are to be designs furnished expressly for the proposed building, and no other. All the competitors should draw to a similar scale, say one-quarter of an inch to the foot. No coloring should be allowed. Each drawing should be a line drawing.

Another subject to which I would call your attention is the importance of exhibitions of the works of the members of the Institute. These exhibitions might be annual or semi-annual. If the former only, I would suggest the convenience of having them during or immediately after the Annual Convention of the Institute. The exhibitor should send in his best, and generally his latest productions. These exhibitions would indicate our progress from year to year, mutually benefit the members, and enlighten and interest visitors and friends of the Institute.

For a very interesting account of the successive amendments to, and the practical and beneficial working of the Building Law, I refer you to the report of the Committee on Examinations.

The Committee on Education will give you their views in regard to that all-important subject. The scheme they propose for the realization of those views, will, I think, commend itself as a large and liberal one, as well in its intellectual and moral bearings, as in a material sense, but not too unwieldy, I trust, for the united Institute to cope with, practically. In any event it is worthy of the abilities and culture of the gentlemen who have concocted it, one of whom, and not the least enthusiastic in the work, has just left us for a visit to the other side of the Atlantic. Let us unite in the hope that when he returns among us, refreshed for the renewal of his labors, he will find that we, as a body, and as individuals, have not been idle meanwhile in the common cause, nor suffered the seed he has helped to plant to perish for want of fostering it.

The Committee on Library and Publications will also present you with a Report, to which I beg leave to call your earnest attention. I need only allude, in the way of hearty endorsement, to their plea for the importance and value of a well-selected Library. It has an able advocate in the scholarly Librarian.

In conclusion, I would remind you of the propriety and duty of the close attendance of every member on the meetings of the respective Chapters, as well as on our annual conventions, and of the faithful observance of all the rules and regulations of the Institute. Thus, we shall keep up the tone of an organization, the importance of which, in our professional lives, cannot be over-estimated, and do each his share in the preservation and quickening of that *esprit de corps* which is so essential to our efficiency, permanence, and success.

Report of the Board of Trustees.

October 22d, 1867.

The Board of Trustees would respectfully report:

That their first meeting was held on the first day of April, at which one member of the Board, Mr. Chas. D. Gambrill, resigned, and Mr. Henry Dudley was elected to fill the vacancy.

The term of service of the four members of our Board was ascertained by lot, in accordance with the requirements of By-Law 4, resulting as follows, viz.:

Leopold Eidlitz, four years.
H. Dudley, three years.
Calvert Vaux, two years.
Detlef Lienau, one year.

The term of service of the latter named gentleman having now expired, it will be the duty of the Institute, at its present Convention, to elect a Trustee, together with a member of each of the three Standing Committees to serve each for four years, all in accordance with By-Law 4, as also Officers of the Institute, to serve during the ensuing year.

The Trustees have fixed the time of their regular monthly meeting for the third Monday of each month.

Through the influence of Mr. Ware, of Boston, traveling in Europe, the A. I. A. was brought prominently to the notice of the Royal Institute of British Architects, by an address which he delivered before that body, at one of its meetings, and by the presentation of photographs of work of our members. As a result of this action on the part of our fellow-member, Mr. Ware, the Trustees have received a large collection of publications termed "Sessional papers of the Royal Institute of British Architects," presented by that Institute to the A. I. A., and as a further result of respect, our very worthy President, Mr. Richard Upjohn, was elected an honorary member of that body. On the 8th of May, the Board of Trustees authorized the Committee on Library and Publications to republish, for distribution among the members of the Institute, the sessional paper of the R. I. B. A., containing the professional practice and charges of that Institute.

The Board of Trustees have had two applications for membership, and letters of inquiry in reference to membership from several others.

Owing to the desire expressed by many members of the Institute to have, at their Convention, an exhibition of the principal works of the members, and owing to the want of time, when this desire was expressed, for getting up the exhibition before the day provided in the By-Laws, the Trustees, in making the arrangement for the Convention, as per By-Law 14, determined to postpone the business of the Convention from the 8th to the 22d of October, and notified the members accordingly.

FREDERICK C. WITHERS,
Secretary.

Treasurer's Report.

R. G. Hatfield, Treasurer, *in account with* American Institute of Architects.

Received from February 15th, 1867, to date.	
Cash on hand, February 15th, 1867, . . .	$34 31
Contributions of 37 members—$20 each, . .	740 00
“ “ 8 “ 10 “ . . .	80 00
“ “ 2 “ 5 “ . .	10 00
“ “ 1 “ —arrearage, . .	30 00
Interest on U. S. Securities, ...	20 66
	$914 97

Paid from February 15th, 1867, to date.	
Stationery and U. S. Revenue Stamps, . . .	$60 66
Rent of Rooms, ...	56 00
Premium on U. S. Securities, ...	1 10
U. S. Security ($200 Bond), ...	213 72
Printing new Constitutions, By-Laws, &c., . .	241 50
Stationery and Printing, ...	26 25
Law-form for Annual Report, ...	10 00
Cash on hand at date, ...	305 74
	$914 97
Cash on hand as above, ...	$305 74
Present value of $500 U. S. Bond, . . .	537 50
Amount of Cash and U. S. Bond, ...	$843 24

New York, October 1st, 1867.

Report of the Committee on Examinations.

The Committee on Examinations of the American Institute of Architects, respectfully report:

That since their last report they have had three meetings for the examination of candidates for the office of inspectors, at which certificates B were awarded to seven candidates, and two were rejected.

They have also held surveys upon twenty-three buildings reported to be unsafe.

They have also been called together at the request of the Superintendent of Buildings, to examine the plans for the enlargement of the store of A. T. Stewart, Esq., but as the drawings submitted to them were not sufficiently explicit to enable them to form any definite opinion upon the merits of its construction, the following letter was agreed upon, and sent to the Superintendent:

"New York, 5th July, 1867.

James M. Macgregor, Esq.,
Superintendent of Buildings, New York City.

Dear Sir:

In compliance with your request, the Committee on Examination of the American Institute of Architects met on the 3d instant to examine the plans submitted to them for the proposed enlargement of the store of A. T. Stewart, Esq., prepared by Mr. John Kellum, Architect. After a careful investigation of the same, the Committee would say, that they readily conceive the possibility of erecting a building of the form proposed, which would be perfectly safe; but, in the absence of drawings showing the details of the construction of the various portions of the iron work, they consider it utterly impossible to form an opinion as to the merits of the plans of the building submitted to them. There are also such great discrepancies between the drawings and specifications, that the difficulty of forming an opinion is very much increased.

Very truly yours,
HENRY DUDLEY,
Secretary of Committee.

By order of Committee."

In the examination of buildings reported to be unsafe, your Committee have a delicate duty to perform. For, in the first place, they have, as it were, the lives of the public at stake, and, on the other hand, they have to see that the law is not made to become burdensome upon the individual. In most cases, the buildings have been in such a condition that scarcely a difference of opinion could exist, but in two or three cases there has been room to doubt, and in one case the Superintendent differed from the other two parties making the inspection, and refused to sign the report. Generally the decisions of the Committee have been cheerfully complied with, and the instances are but few in which it has been necessary to carry them into court in order to enforce them. The law by whose authority your Committee perform their duties, enacted through your instrumentality to protect the public against unsafe buildings, has been the means of accomplishing much good. By its power many dilapidated and unsafe structures have been removed, and the character of new buildings considerably improved. For the good results of the law the Institute may congratulate itself, but your Committee would respectfully call attention to some points in the law which they think defective and which call for investigation and amendment. The provisions of the law regulating the construction of *Tenement Buildings* are, in many cases, burdensome to the proprietors, without giving any corresponding security to the tenants. The provision for stamping plans by the Superintendent of Buildings is, in a measure, subversive of the law, as the very cursory examination which can, under existing regulations, be given to each set of plans and specifications, renders it impossible to detect the defects concerning which, by the act of stamping, the architect, owner and builder are wholly relieved from any responsibility.

Either the practice of stamping the plans and thus taking upon the department the responsibility of all defects, ought to be wholly discontinued, or else the duty of examining plans and approving them should be confided to a board of competent architects. Unless this is done, the department will be liable to censure, and the City greatly damaged by a law instituted for its improvement. Your Committee will mention one other point of the law requiring attention.

Inasmuch as the officers appointed to the execution of the law have received their positions by virtue of credentials issued by your Committee, and as the success of the law depends in so large a degree upon the faithfulness of the officers in whose hands the execution of it is intrusted, your Committee have felt a lively solicitude that their nominees should justify the confidence placed in them, in nominating them to such responsible positions. But the interest thus taken by your Committee in the execution of the law is inoperative and useless, in the absence of a provision in the law giving to your Committee, or to some competent body, any supervisory power over the acts of the officers of the law.

These defects in the law, and some others in regard to the details of construction, seem to require investigation and correction, and your Committee would recommend that the Institute take some measures by which the law may be rendered more perfect in its operation.

All of which is respectfully submitted,

RICHARD UPJOHN,
F. DIAPER,
R. G. HATFIELD,
HENRY DUDLEY,
D. LIENAU,
Committee on Examinations.

NEW YORK, 1st OCTOBER, 1867.

Report of the Committee on Education.

To the American Institute of Architects:

Your Committee, to whom was entrusted the subject of Education, most respectfully submit:

That with the best natural abilities on the part of the people, taste, in matters of art, is mainly the result of education.

That the only means of popular education in architecture, now afforded, is in a study of the works actually executed, and placed before the public as examples.

That these works contain so large and overwhelming a majority of defective and perverse architecture upon which the eye of the public is constantly resting, and towards which so large and respectable a class representing the building interest and its financial results is constantly contributing, that upon the whole a prepossession in favor of the false in architecture is quite natural, not to say inevitable. It is evident, therefore, that the desired advance towards the true in art will be attained only in the education of the architect, and that this advance will be just to that degree that such education is thorough and comprehensive, and from pure sources.

A thorough education in architecture must comprise both a Polytechnic School and an Academy of Art; and as auxiliaries a Library and a liberal stock of scientific apparatus.

The polytechnic school, to be financially successful, should include also an education in civil and mechanical engineering, possibly mining; and might, with good results, connect with it departments of chemistry and commerce. Of course the modern languages should be taught, one or two of which should be made obligatory upon all students.

The academical course should comprise æsthetics in general, and more particularly in architecture, the history of art, and the practical solution of problems in construction and architecture.

The first element of success in the foundation of a polytechnic school and academy, as indicated above, is necessarily a perfect independence, not only of all political or social controlling influences, but also of its own pupils; in other words, the institution should have a sufficient fund of its own to be independent of outside support, and to be able to encourage merit and rebuke deficiencies in its pupils without fear of losing them.

Nor should any one connected with its management derive from it any pecuniary benefit whatever.

It must also be made a fundamental principle that all money accruing over and above its wants and obligations, not needed for the extension of the Institution itself, should be applied, first, to free scholarships; second, to prizes for the encouragement of merit; and third, to the reduction of fees demanded for tuition.

To accomplish these objects your Committee respectfully recommend:

1st. That a Polytechnic School be founded by the American Institute of Architects, to be governed by a committee of five, elected by the Institute from its members, for the term respectively of five, four, three, two years and one year, and that every year the number of said committee be made complete by an especial election, held for that purpose by the Institute from a number of candidates, not less than five, proposed by the said committee, and that said committee be styled the Board of Control.

2d. That the President of the American Institute of Architects be *ex officio* president of the Polytechnic School; and the chairman of the said Board shall be the secretary of the Institution.

3d. That the financial interests of the Institution shall be directed in perpetuity by a Council of not less than five nor more than ten influential citizens, who may have commended themselves by their zeal for art, and whose acknowledged abilities fit them for this work. This Council shall be selected by said board, and shall hold their office during life, and shall themselves fill vacancies in their number, caused by death or otherwise, by ballot, from candidates proposed by the Board of Control. The Council, in the discharge of their duties, to be guided by a constitution and by-laws to be hereafter framed.

4th. If, in course of time, an association should be called into existence which represents the engineering interest in the same spirit as the American Institute of Architects represents the interests of our own profession, namely, an institute for the intellectual improvement of its members—in contradistinction to a mere association for material or financial benefits—the president and vice-president of such association shall be *ex officio* members of the said Board of Control, appointed by the Institute of Architects.

The Board of Control shall nominate all professors—shall propose all books and scientific apparatus to be purchased, while the Council shall determine salaries, and shall grant or refuse appropriations for expenditures ordered by the Board. No member of either the Council or the Board shall hold any office or professorship, or derive any pecuniary emolument whatsoever from the Institution. The chairman of the Council shall be vice-president of the institution.

COURSE OF STUDY.

While your Committee have given much thought to a detailed plan of what should be taught in the proposed polytechnic school, and deem it their duty to communicate the result of their investigation, they request the final settlement of this matter to be deferred until after their return from Europe, where they propose to examine the principal polytechnic schools and academies, with a view to perfecting their scheme.

Candidates for scholarship in the polytechnic school should pass an examination equivalent to one passed by a graduate from our standard public schools.

These pupils will enter the preparatory school, where they will be taught, in a course of two years—

Drawing.
Elementary Mathematics.
Geometry.
Trigonometry.
Geography.
Elementary Chemistry, and one language—either French or German.

The next course—of three years—will be open to graduates of the preparatory school, or to those who shall pass an examination the same as that passed at the preparatory school, and will comprise the following studies:

Drawing.
Higher Mathematics.
Natural Philosophy.
Mechanics.
Civil Engineering, Triangulation.
Astronomy.
Construction—Architectural.
    Do.   Naval.
    Do.   Mechanical.
Chemistry.
Two languages.

The academical course will be open only to students who have passed an examination at the polytechnic school, and will be devoted to

Æsthetics.
History of art, and
Architecture.
Drawing.
Essays on the above subjects; and
Practical solution of problems.

This course, it is supposed, will require two years, and a course of one year for graduates.

It is proposed, also, to connect with the institution a school for mechanics, where drawing, elementary mathematics, geometry, modelling and construction, will be taught during evenings, and at any other time convenient for the purpose.

FUNDS.

To accomplish the objects set forth above, it will be necessary to raise a fund of $500,000. It is presumed that this large amount will be raised by the voluntary contributions of our wealthy citizens, from all parts of the country, who, by devoting their share towards this much needed enterprise, will not only ensure a thorough education for future generations, but also enhance the value of their own future investments, for it will be readily admitted that the value of our investments is entirely dependent upon the intelligence which directs our labor.

Of the sum above named it is proposed that $200,000 shall be expended in procuring suitable buildings, and that the remaining $300,000 shall be invested either on bond and mortgage or in government securities, or both, as the Council may direct, and that the interest of the same shall be used exclusively for the payment of salaries to professors, as long as the income of the institution shall be insufficient for that purpose. As soon as the income exceeds the expenditures by twenty per cent. $200,000 out of the above $300,000 are to be expended in the acquisition of a Library and scientific apparatus. The remaining $100,000 are to remain a permanent fund, which is never to be reduced, nor is it to be augmented, beyond the sum of $300,000.

It is the intention of your Committee to allow no contribution to become a lien upon the Institution, or to assume any mode or form of indebtedness, and yet these contributions are proposed to be returned to the donors out of such earnings as shall not be required for the purposes enumerated above. It is proposed that donors shall have the preference in appointing free scholarships, as soon as the Institution is able to offer them, and thus receive, at a rate hereafter to be fixed, a compensation for their outlay.

SITE.

In regard to a location for the Institution, it is proposed that a site be secured either on the upper part of this island, or any other eligible spot on the Hudson river in Westchester county, and that the sum of $100,000 be devoted to the purchase of a sufficient quantity of land to form a moderate college town entirely under the management of the Institution.

One-half of this land it is thought can be advantageously leased, or perhaps, in part, sold under proper restrictions, subjecting it to the constant control of the Institution for purposes of boarding and otherwise maintaining the students and professors, which sale or lease would very nearly, or perhaps fully, liberate the capital of the original purchase, or yield an income equal to its interest. This would leave the sum of $200,000 for the erection of the necessary buildings, to contain lecture rooms for the accommodation of two thousand students, which sum your Committee deem sufficient, if, as they propose, those buildings are constructed in an economical manner.

CONCLUSIONS.

From data collected by your committee it would appear that the Institution will command as many as four thousand students per annum; but assuming that for the first ten years we should not average more than one thousand, they would, at a fee of $150 per annum, meet the expenses of the institution ($90,000 for thirty professors at $3,000), and $10,000 to $20,000 for other expenses, and leave a surplus of $30,000 each year, which, together with the interest of its permanent fund, would form a sinking fund sufficient to return the original donations.

The school for mechanics will be held in the city, and teachers supplied from the graduates, and as rooms for that purpose will, we are assured, be supplied by other benevolent corporations, who deal especially with the interests of the mechanic, the Institution will be enabled to furnish instruction without pay.

A course of commercial instruction, comprising a knowledge of raw materials, chemical compounds and manufactured articles, also of the productions of different countries, their money systems and commercial laws, of banking customs and the commercial branch of political economy, will be open to all who have passed through the preparatory school, or passed an examination equivalent to it.

Your Committee consider it unnecessary to further elaborate the details of the above plan for a comprehensive educational institution in the interest of our profession, only the outlines of which they have here attempted to sketch. They feel that they are not too sanguine in claiming for it an influence and an interest commensurate not merely with the whole extent of our country, but limited only by the boundaries of our hemisphere. From every state in the Union, from the provinces of the North, from Mexico, Cuba, and the neighboring isles, all who have aspirations for the highest culture in science and art will come to partake of the advantages pertaining to a seat of learning so favorably located at the great metropolis of the New World.

They would, therefore, respectfully recommend that measures be at once taken by the Institute to carry the suggestions here made into effect, and that an active canvass be immediately instituted to procure the indicated endowment necessary for its initiation and maintenance.

LEOPOLD EIDLITZ,
R. G. HATFIELD,
EMLEN T. LITTELL,
S. A. WARNER,
W. R. WARE.
Committee on Education, A. I. A.

New York, October 22, 1867.

Report of the Committee on Library and Publications.

To the American Institute of Architects:

The Committee on Library and Publications met for organization on the 9th of April last. A quorum being present, your Committee proceeded to elect permanent officers. Mr. Richard M. Hunt was elected Chairman, and Mr. P. B. Wight was elected Chairman *pro tem.* to serve during the temporary absence of Mr. Hunt in Europe. Mr. A. J. Bloor, Librarian of the Institute, was elected Secretary.

At the very outset your Committee encountered a serious obstacle to a prompt performance of its duties in the absence of two of its members from the City of New York, in which its meetings have been held. Mr. Hunt was in Europe at the time of his election to the Committee, and Mr. Van Brunt resides permanently in Boston. The last named gentleman has not attended any of the meetings of the Committee, but has corresponded with its Secretary. Hence it will be seen that it has been impossible to get a quorum without the presence of all the three members residing in New York, upon whom it has devolved to transact all the business of the Committee.

In order to fully effect the organization of the Committee it was necessary to fix the terms of service of the respective members, in accordance with the requirements of the By-laws. Lots were cast, and as a result the number of years drawn for each member was as follows :

Mr. Bloor, - -	Five years.
“ Hunt, - - -	Four “
“ Wight, - -	Three “
“ Van Brunt, - -	Two “
“ Potter, - -	One year.

Your Committee, being organized, immediately proceed to take under consideration the various matters which are given over to its care and consideration by the By-laws.

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As to what your Committee has accomplished, but little can be said. The numerous expenses attendant upon the reorganization of the Institute, have drawn so heavily upon the Treasury, that the Board of Trustees has been unable to appropriate to the use of your Committee any considerable sum, so that the execution of any measure calling for the expenditure of much money has, of necessity, been avoided. The bulk of this Report therefore will refer to what your Committee propose to do, (with the consent of the Institute), toward furthering the objects for which it is constituted.

An examination of the Library of the Institute, (intrusted to the charge of this Committee by the By-laws), soon revealed the fact that the care of such a meagre collection of books would be a light matter; but resulted in a conviction that the great duty of your Committee would be to fill those shelves with serviceable books. It would be waste of time to dwell upon the necessity of so doing. This has long been fully appreciated, and there is no doubt but that the Institute would have had a creditable Library by this time had the funds for purchasing books ever been in hand. Such books as it does possess testify to the generosity of many of its members, and their devotion to the great object held in view by your Committee. Knowing, therefore, the feeling of the members in this respect, it only seems necessary that an organized and united effort, according to some well digested plan of proceeding, should be made, and it will surely result in the acquisition of many of the requisites of a good Library. What your Committee propose to do in this respect will be alluded to further on.

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At a meeting held on the 18th of May last, the following communication was received from the New York Chapter.

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"New York, 22*d April*, 1867.

"Sir:—I have the honor to call your attention to the following proceedings at the last regular meeting of this Chapter, held on the 16th inst.:

"The Secretary read a recently written letter from Mr. W. R. Ware, of Boston, to Mr. Upjohn, President of the Institute, dated from Italy, informing him of his (Mr. Upjohn's) election to Honorary Membership in the British Institute of Architects; of the cordial reception by that body of himself, and of the interest it manifested in some photographic copies of the designs of members of the American Institute of Architects which he had carried out with him to Europe, as also of its desire to have further specimens of the same; and of its decision to transmit to the Institute here, copies of some of its own designs and publications."

"Mr. Upjohn said, that when Mr. Ware had called on him before leaving for Europe, he had thought little of his scheme of carrying out copies of the works of our Architects, supposing that the achievements in architecture of this new country would not favorably compare with those of England, and that consequently but little interest in them could be expected from the Institute on the other side; but the reception of Mr. Ware and the charge entrusted to him, had proved the contrary, and he now felt it desirable to cöoperate cordially in the international work so well begun by Mr. Ware, and to strengthen what had been already accomplished."

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"After some discussion it was moved and seconded that the attention of the Committee on Library and Publications of the American Institute of Architects, be directed to the desirability, in the opinion of the New York Chapter, of the collection of further copies of architectural designs of members of the Institute, for transmission to the Royal Institute of British Architects. The resolution was adopted by vote."

Respectfully,

ALFRED J. BLOOR,

Secretary.

P. B. Wight, Esq.,
Chairman Com. Lib. & Pub., A. I. A."

The suggestion made by the Chapter was accepted by this Committee, and steps were immediately taken to carry out the scheme.

The substance of the resolutions passed in this Committee was fully embodied in the circular subsequently prepared by the Secretary and Librarian, a copy of which is annexed to this Report. [Appendix A.] It was sent to all accessible Architects in the United States.

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It will be observed that the time fixed for receiving the contributions expired on the 1st of July last.

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But when the 1st of July came it was found that but few had responded.

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Accordingly your Committee extended the time for the reception of contributions, and fixed upon December 1st as the date for transmitting the pictures to the Royal Institute of British Architects.

The circulars were again sent out and your Committee are now waiting for the result.

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On the 18th day of May last, a communication was received from the Board of Trustees, requesting this Committee to republish for the information of American Architects, so much of the "Professional Practice and Charges of Architects" adopted by the Royal Institute of British Architects, as would be applicable to the practice of architecture in this country. In accordance with that suggestion, your Committee have caused the English Schedule to be printed in the form of a placard which can be posted in Architects' offices. After due consideration, they concluded to omit certain sections referring to conditions which could not exist in this country. The document has been freely circulated by this Committee, both among members of the Institute and Architects generally, throughout the country. It is to be hoped that it will contribute toward establishing a uniform method of practice among all the members of the profession, and it seems to your Committee, that inasmuch as there is no inconsistency between it and our own Schedule, but that, on the contrary, it rather explains and elucidates our own, it would be well for our Institute to adopt so much of the English rules as have been republished by this Committee. A copy of the document is annexed to this Report. [Appendix B.]

In the absence of any official journal in which to publish the proceedings of the Institute, your Committee think it advisable to publish occasional papers on useful topics. These should be made uniform in printing and size, so that they can be bound together when a sufficient number shall have been published. Nothing of this nature has yet been done, but it seems that when opportunity offers it should not be neglected. In this connection it is proper to mention a matter that has been considered by the Committee. It is well known that for some time Mr. R. G. Hatfield, Fellow, has given considerable attention to computation of the relative strength of materials, and to other constructive matter—the results of which investigations must be of great value to the profession at large, as well as to the author of them. It is believed that if these are published they will form a valuable book of reference for every practicing Architect. Your Committee feel warranted in saying, that Mr. Hatfield has not made these researches solely for his own use, but is willing to impart to his professional brethren all the benefits that can be obtained from them. It has, therefore, been thought advisable to ask Mr. Hatfield to furnish a copy of these computations for publication. In answer to this invitation, Mr. Hatfield has consented to give his manuscript to the Committee as soon as his engagements will permit. He proposes that the publication be made in occasional numbers. Your Committee trust that they will be able to issue the first of these interesting articles at an early day. But if there should be any prospect of the establishment of an official journal, it is considered advisable to wait until they can be published in that.

Your Committee, in view of the comparative uselessness of the Library, have thought favorably of a plan, proposed by the Librarian, to temporarily supply it with loaned books, and to facilitate consultation of books among members. This scheme has been acted on by the Executive Committee of the New York Chapter, and meets the approval of this Committee.

The subject of the enlargement of the Library has mainly occupied the attention of your Committee. There being no question as to the great desirability of so doing, it has only been necessary to consider how it can be practically effected. The only question that has arisen, is as to whether it is best to concentrate our efforts toward establishing an Institute Library, or divide our labor on separate Libraries for Chapters. There can be no doubt that both will eventually exist, whatever may now be done. Small as the collection of the Institute now is, it contains some valuable books, including the donations recently received from the Royal Institute of British Architects, and there is every reason to believe, that by the force of circumstances with which it is surrounded, it will naturally continue to increase. As the Institute only is known in Europe, and as all correspondence with similar bodies abroad will be carried on by its officers, there can be no doubt that all donations from such bodies will be intended for its Library. The importance of the Institute Library is not, therefore, to be underrated. Whatever accessions Chapter Libraries may receive, will be mainly from local sources. Yet there seems to be no reason why the Chapters may not have large Libraries of their own; and if the New York Chapter chooses to extend its efforts in that direction, it is at liberty to accept the suggestions of this

Committee, and utilize the results of its labors.* It is evident that they are as applicable in the case of any Chapter Library as in that of the Institute, and *vice versa.* But as the Committee on Library and Publications have to look after the interests of the whole Institute, its suggestions are intended to have special reference to the enlargement of the Central Library.

Your Committee therefore propose to invite contributions, both in money and in kind, from our own members, and from that portion of our citizens who can be induced to become interested in the undertaking. To this end it is essential that the Library should be a free one, and should be strictly an Architectural Library, offering the privilege of its shelves to all who take an interest in the subject, or desire to study the profession. It will be impossible to interest the outside public unless they can receive these assurances. Some modification would have to be made in the regulations, and it is suggested that, when a respectable number of books shall have been obtained, the privilege of consulting them in the rooms of the Institute be extended to all who shall receive a card of admission from the Librarian, and that the Library be open every day and night. Your Committee would appeal not only to the generosity of the public, but to the self-interest of our moneyed men. They are confident that a proper representation of the case would result in convincing the business community, that it would be making a paying investment to contribute toward the education of those who are to exert such an influence upon the expenditure of large amounts of capital in the future. It can be easily shown that no American Library, now in existence (in New York at least), offers the advantages to students of architecture that the well filled shelves of the Institute might confer. The Astor Library contains the only collection of works on Architecture at all approaching completeness; but even that great Library has been unable to keep up its purchases during the last six years, on account of want of funds, and the most valuable books, to students, of this speciality, are not to be found on its shelves; for the most valuable books on Architecture have been published within ten years past. Besides, that collection is sealed to all after sun-down, and thereby bars out nearly the whole class of Architects, Draughtsmen and Students of Architecture, all of whom are, or should be, engaged in practical work in the day time. The public will, at least, have the assurance that such a Library as we may establish will be a living, practical thing, managed by men who themselves are to be greatly benefitted, and whose profession is to be ennobled, by it.

In order to be fully prepared for carrying this scheme into effect, your Committee have prepared a Catalogue of works, which it is desirable to procure. It has been thought that such a Book-List would be valuable not only for the purpose now in view, but for the assistance of members of the Institute in making private collections. The object of the publication is fully set forth in the following resolution passed, in Committee, September 26th, 1867:—

"*Resolved*, That the annexed Catalogue of Works on Architecture be published for the information of the Institute, and of Architects generally; that it is recommended that such works on this Catalogue as the Committee on Library and Publications shall select, be purchased from time to time, as opportunity shall offer, and that contributions to the Library of the Institute, both in money and books, be solicited from members of the Institute and other persons interested in its objects and aims, to whom this Catalogue is offered as a guide and assistant." * * * * A number of copies have been printed, and are at the service of members and all others interested. A note at the head of the list is intended to give information in relation to the purchase of books to all who may feel disposed to present special works.* But it would be much more advantageous to the Library to procure subscriptions in money, inasmuch as unusual facilities are given to Libraries, in the purchase of books. Many, however, might wish to see their own contributions on the shelves, and, perhaps, might feel disposed to give only on that condition.

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*This suggestion has been accepted and acted on by the New York Chapter, and a resolution passed instructing its Secretary to submit the following additional rule of order for the consideration of its members: "The Library Committee shall consist of five Fellows, including the Librarian, who shall have all the powers exercised by the Committee on Library and Publications of the Institute."

* The following is the note referred to:

The following Book-List does not comprise everything that it is desirable to have in an Architectural Library. The works mentioned are mainly technical in their nature, and are such as it is thought proper to recommend for the *nucleus* of a Library. It is believed that the list comprises all the latest publications that would be valuable to the Institute. The works published by the house of Morel & Co., of Paris, are not dated, as nearly all of them are issued in small editions to meet the current demand, and bear recent dates. This house, the principal Architectural Publishing House in Europe, has established an agency in New York at the store of F. Christern, No. 863 Broadway, under the direction of Mr. Charnay, who has sample copies of nearly all of the publications of the house. The Books and Periodicals that can be procured through Mr. Charnay are marked thus*.

Scribner, Welford & Co. are agents for nearly all the English Publishers of Works on Architecture. D. Appleton & Co., and D. Van Nostrand keep many English and American Architectural Books for sale. Leypoldt & Holt have facilities for importing German Publications.

The Catalogue comprises one hundred and thirty-seven works, exclusive of periodicals, and two hundred and four volumes, exclusive also of periodicals,—of which there are thirteen mentioned—and proceedings of societies,—of which there are two. A number of the works on the list are in course of publication. Estimates have been obtained from publishers and agents for the supply of all the works on the list that are in the market. The total cost to the Institute, exclusive of the above mentioned periodicals, etc., would be three thousand seven hundred and twenty-six dollars and sixty-three cents ($3,726.63). Many of the works on the Catalogue are large and costly, and it is, perhaps, well to explain here, that the selection has been made of such works as are thought desirable to have, without regard to cost. But by excepting five works, which are very costly, the whole collection could be procured for two thousand eight hundred and fifty-eight dollars and forty-three cents ($2,858.43). A complete file of all the French journals would cost five hundred and ninety dollars and sixteen cents ($590.16). A file of proceedings of the Archeological Institute would cost two hundred and thirteen dollars and seventy-five cents ($213.75). Estimates have not been received for files of the English periodicals, but it is believed that the expense would be about the same as that of the French journals.

This Catalogue serves for still another purpose: it enables us to show, to those upon whom we call for assistance, exactly what we propose to do. A copy might be put into the hand of every one who is asked to subscribe. All that is required is a resolute set of canvassers, and it is, perhaps, needless to say that every member of the Institute should be one. Your Committee propose to take the lead; but they will require assistance. They therefore appeal to all the members to join in the work.

The Librarian of the Institute and Secretary of this Committee has prepared a circular letter, setting forth the claims of the Library upon the Institute and the public. The following extracts from his plea have been embodied in this Report:—

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"It appears evident to those whose culture and experience * * * * qualify them perhaps to be accepted as authorities in the premises, that the American public is at present in a remarkably impressible and sensitive condition as regards art in general, and not least as regards its architectural developments. Thus, at a meeting of the New York Chapter of the Institute, last Spring, it was stated, by a member, that he had had some experience in London, fifteen or twenty years ago, in the matter of architectural exhibitions, and it was his conviction that the public mind in America is at present more sensitive on the subject of architectural art than the English mind was at that time. This accords, indeed, with what might safely be predicated of the relations between a people at once so practical, so imaginative, and so addicted to immediate, tangible results as ours, and an art which contains, within its various fields and on its different planes, not only all the finest and most impalpable elements of æstheticism, but all those alone evolvable in perfection, by the rules of the most rigorous science, and the application of the most practical drudgery in mechanics. But, while this more available receptivity is a point to be desired, it must be remembered that great strides have been made in England during the last two or three decades in architectural design, as may readily be seen by a comparison of the published copies of designs made then and now. In fact, fifty years ago—or, at least, so most architectural scholars think—there was as little of the spirit of genuine æsthetical construction evolved in current designs in England, as there now is in the current designs of Italian Rome, of Grecian Athens, or of American Julesburgh. It is further to be considered, that while the masses here are doubtless in a more hopeful condition artistically—whether as regards sensitiveness to art or as regards means for gratifying their tastes—than those of older countries, yet architectural practitioners among our trans-atlantic cousins have the great advantage—especially where large public buildings are concerned—of dealing with an appreciative and well-paying governing class, who have been accustomed, from the cradle, to accept the appliances of art as co-essential and co-rateable with their food and raiment, their means of shelter and locomotion, their religious, medical and legal safeguards; while, owing to the physical combinations of our new and but partly peopled country, with its popular political institutions, such conditions are not, of necessity, found in the ranks of those who, more or less temporarily, fill official posts.

"If these views are correct, it would appear that, however apt the field may be, there is an urgent need of laborers in it, and of their being armed with all available instruments and means for their work; * * * * and it is believed that those persons of means, who recognize that architectural art is one of the most practicable as well as most improvable forces of civilization, and who are impressed with the importance of keeping the civilizing forces of this nation at least up to the level of those of other nations, could not have a better opportunity for showing their faith, and for aiding in the national improvement and perfection of the art, than by furnishing material for the realization of the aims of this Committee. * * * * * *

"The Institute, as represented in this Committee, does not invite coöperation from the public on the score of the claims of architectural art and science as paramount to all other arts and sciences, nor of collective science or art as paramount to all other forces in the activities of life. There is, indeed, no material or mental microscope powerful enough to discover the ultimate elements of strength and grace folded up in any subject that lies beneath the observation of intelligence; but this is true, in a greater or less degree, of all the manifestations of existence, and the professors of any of the forces of civilization do but show their limitations and their vanity, when they assume unshared sacredness, or exclusive importance for the speciality on which they achieve or predicate whatever small measure of success fits their individual powers and visions. The Committee recognizes that it is a foolish idolatry which sets the mere selfish acquirer of any science above the uncultured who, nevertheless, possess "pure religion and undefiled;" and that the most exquisite utterances of recognized, but unsanctified art, are but "as sounding brass or a tinkling cymbal" offset against the life which, however low-toned and obscure, is, at the same time, levelled, with sometimes unconscious saintliness, to its highest recognized plane of duty and aspiration. * * * *

"It is, therefore, with no petty, conceited notions of the paramount importance of its aims, or the paramount purity and efficiency of the professors and practitioners of its art, that the Institute, as represented by this Committee, asks the sympathy and coöperation of the community in which its lot is cast. It presents the claims of a speciality with which it is providentially connected, and with the interests of which it is therefore providentially charged, rather in the spirit of that fraternity which is the burden of the Gospel's teachings, of the feeling that it has no right to reserve its benefits for selfish isolation, and of that humility which recognizes that not all the resources of its art can build a pyramid substantial enough to ensure its own origin from oblivion, or rear a triumphal arch high enough to shut out from the world the hosts of Sin and Death; but believing, at the same time, that in our times, and to-day, if the nature of a man is broad and pure enough to receive the spirit, it may, as when the Lord spake unto Moses, saying, 'See, I have called by name Bezaleel, of the tribe of Judah,' be, like his, filled 'with the spirit of God, in wisdom, and in understanding, and in knowledge, and in all manner of workmanship, to devise cunning works, to work in gold and in silver and in brass, and in cutting of stones to set them, and in carving of timber, to work in all manner of workmanship.'"

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If an organized effort is made in the direction indicated, and the result should be successful, another question would naturally arise, and it may as well be anticipated. That question is as to the location of the Library. For, as an Institute affair, every member will be equally interested in it It is to be presumed, however, that all will contribute, if not in money at least in efforts to procure contributions, and it is to be hoped that assistance will be received from other parts of the country, though there can be no doubt that the bulk of the contributions will be from the City of New York. Justice would seem to dictate that some system of apportionment should be adopted, by which as many members as possible may be able to receive equal benefits. This can only be done by procuring several copies of the most desirable works, the extra copies of which could be placed in charge of other Chapters, (when formed), in proportion to the contributions received by them, or in proportion to the number of members. This might or might not be practicable, and your Committee does not pretend to give a decided opinion upon the matter, but feels bound to weigh the question in all its bearings, and present it for your consideration. Should such a contingency arise, as that the Library should be created by the munificence of citizens of New York alone, it is hardly to be presumed that any serious effort would be made to remove it from this City. There can be no doubt that the *prestige* of a Library of the American Institute of Architects would be greater than that of any Chapter, and that if it is possible to have such a library compacted the substantial profit to each individual member would be as great as if the books were distributed. The main point, however, is to get books, and as long as true fraternal relations exist between the members, nothing need be feared as to the results. Whatever may be found to work badly in practice may easily be corrected, if the proper spirit is shown by all.

The getting of books is hardly more necessary than the accumulation of a Collection of Photographs, which rank next to books in value to the student of architecture. The Library already has a more plentiful collection of these than of books. But it often happens that opportunities are afforded for the purchase of rare and valuable photographs which must now be lost on account of want of funds. Photographs should always be kept in scrap books and albums, and should be classified. Pictures of modern work are very desirable, and as illustrating one phase of progressive modern ideas the present from the R. I. B. A., which we have reason to anticipate, will be especially valuable. It is equally desirable that domestic as well as foreign Photographs should be collected, and it is hoped that the suggestions toward collecting such, which have been made by this Committee in a recent circular, will be cheerfully acted upon.

Your Committee beg leave to offer some suggestions in relation to Reading Rooms. By reference to the Catalogue of Books above mentioned, it will be seen that as many as thirteen periodicals are enumerated. Of these, six are English, six are French, one is German, and one is either French or German. Complete files of all of these should be got for the Library of the Institute, and would make a collection of more than one hundred volumes by themselves. It is rather the duty of Chapters to supply their own reading matter, and the main object of referring to the subject now is to make some suggestions to the New York Chapter, and any others that may be formed, as to what journals it is most desirable to take. Of the English Periodicals, *The Building News*, *The Builder*, *The Civil Engineer and Architects' Journal*, and *The Church Builder* are recommended; of the French, the *Gazette des Architectes*, the *Revue Générale de l'Architecture*, and the *Moniteur des Architectes* are recommended; and of the German publications, the *Allgemeinen Bauzeitung* is recommended. The expense of subscriptions to all of these will not exceed one hundred dollars a year. It is suggested that if this expense should fall too heavily upon the Chapters, assistance might be given from the funds of the Institute.

The attention of your Committee has been given of late to the matter of an architectural journal, but they have not been able to find any practical solution to the question. The necessary expense of such an undertaking, the risk involved, and the question of editorship have led your Committee to suggest that it is not desirable to undertake an independent journal at present. The publication of occasional papers would seem to be the best substitute for the present. Besides, the matter of getting up a library seems to be a question of much greater importance, and the accomplishment of that end must suffer if the labor is divided with another undertaking. We have seen that similar societies abroad have succeeded without publishing journals, and private enterprise has supplied what was needed.

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It only remains to call the attention of the Institute again to the several matters suggested above, and to ask for a careful consideration of their merits. It has been suggested that our Institute adopt the schedule of charges of the Royal Institute.

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The matter of enlarging the Library has been dwelt on at such length that it is not necessary to recapitulate it. Your approval of the scheme is asked. If it is adopted, the change in the rules, by which the Library shall be free to all who are duly qualified, will be essential.

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All of which is respectfully submitted.

P. B. WIGHT,
Chairman, pro tem.

ALFRED J. BLOOR,
Secretary.

New York, October 1st, 1867.

APPENDIX A.

American Institute of Architects.

New York, June 1st, 1867.

Dear Sir:

At a recent meeting of the Committee on Library and Publications, A. I. A., it was resolved, that the Committee should endeavor to make a Collection of Photographs and other illustrative works of American Architects, for transmission to the Royal Institute of British Architects, in compliance with the official request of the latter organization. It was also resolved, that Architects should be requested to forward their contributions in duplicate, if possible, in order to allow of a portfolio being formed of one set for retention by the A. I. A.; and likewise to send to its Librarian copies of their future designs for its use.

I have now, therefore, the honor and pleasure of inviting your contributions as above.

The advantages, for mutual encouragement and support, of a liberal interchange of ideas and information among Architects, are obvious, whether the exchange be domestic or international. As an evidence of the benefits derivable from the latter, it may be mentioned that a gift of American Architectural Photographs, made some months since to the British Institute, was officially received and inspected by that body with great interest, followed by the expression of its desire to have further specimens of the same, and of its trust "that they should always maintain that most intimate friendship with the Architects of America, which had been so happily begun"—that the bearer of them, Mr. W. R. Ware, of Boston, as representing the American Institute, received a most cordial official reception from it—that the schedule of prices adopted by the A. I. A. was, by order of its (the British Institute's) Council, republished for the information of English Architects, and that the President of the A. I. A., Mr. Upjohn, was elected one of its Honorary Members, and copies of its official proceedings and documents were transmitted to the A. I. A., accompanied with the promise that "all future Transactions and Publications would follow those already voted," so that, "this (the British) Institute would be continually in communication with those across the Atlantic."

Contributions as above, as well as invoice letters or other communications relative to them, may be addressed to "Alfred J. Bloor, Rooms N. Y. Ch. A. I. Architects, 42 East 14th Street, New York City." As you may be acquainted with architectural practitioners in your neighborhood, unknown to this Institute, whose designs might reflect credit on the constructional science and art of the country, you are respectfully requested to apprise them of this action, and secure their coöperation if possible. It is desirable that the Photographs, or other Illustrations, meant for transmission to England, should, as far as possible, be forwarded before the 1st July ensuing. If convenient for transit, all contributions should be mounted.

I am, Sir,
Yours, fraternally and respectfully,
ALFRED J. BLOOR,
Librarian, A. I. A.,
And Secretary of Committee on Library and Publications.

APPENDIX B.

Professional Practice and Charges of Architects.

Being those now usually and properly made, as confirmed at the Special General Meetings of the Royal Institute of British Architects, held 13th and 27th January, 1862.

[Re-published for the information of American Architects.]

NEW BUILDINGS, &c.

1. The usual remuneration for an Architect's services, except as hereinafter mentioned, is a commission of 5 per cent. on the total cost of the works executed from his designs; besides which, all traveling and other incidental expenses incurred by the Architect are paid by the Employer, who is also chargeable under certain conditions, as hereafter mentioned, for time occupied in traveling.

2. But for all works in which the art required is of a high kind, and the expenditure mainly for skilled labor and not for materials, *e. g.* in designs for the furniture and fittings of buildings, for their decoration with painting or mosaic, for their sculpture, for stained glass or other like works, the Architect's charge is not made by way of commission on the cost, nor does it depend upon the time employed in making the design, but is regulated by special circumstances, and varies according to the skill and artistic power of the Architect.

3. A commission of 2½ per cent. is to be charged upon such works as sculpture, stained glass, and others of a similar nature, for which the Architect does not give the design, but arranges with the artists or with the tradesmen, and directs the work generally.

4. In works under £500 in amount, 5 per cent. is not fairly to be considered as remunerative, and in such cases it is just to the Employer as well as to the Architect, to charge by time or by a scale, varying from 10 per cent. for works under £100, to 5 per cent. on amounts above £500.

5. The commission is reckoned upon the total cost of the works, valued as if executed entirely by labor and of new materials provided by the Builder.

6. The commission is to be charged upon the whole value of the work executed, with addition of 2½ per cent. upon any omissions.

This is exclusive of the charge for measuring extras and omissions.

7. The Architect is entitled, during the progress of the building, to payment on account, at the rate of 5 per cent. on the instalments paid to the Builder, or otherwise to half the commission, on the signing of the contract, and the remainder by instalments as above.

TRAVELING.

8. All traveling expenses are charged extra.

9. These rules suppose the work to be executed within an easy distance of the Architect's office; but if the work be executed at a considerable or inconvenient distance from it, an allowance beyond the 5 per cent. ought to be made for the *time* occupied in traveling, in addition to the actual expenses.

EXTRA SERVICES.

10. The per-centage does not cover professional services in connection with negotiations for site, arrangements respecting party walls, or right of lights, nor services incidental to arrangements consequent upon the failure of Builders whilst carrying out work; but all such services are charged for in addition, the basis for charge being the time employed.

ALTERATIONS IN DESIGN.

11. Supposing that the Employer, after having agreed to a design, and had the drawings prepared, should have material alterations made, an extra charge may be made, according to the time occupied,

12. If the Architect should have drawn out the design complete, with plans, elevations, sections and specification, ready for estimate, the charge is half the usual commission above named.

13. If the Architect should have, in addition, procured tenders, in accordance with the instruction of his employer, the charge is one-half per cent. extra to the above.

ALTERATIONS OF BUILDINGS.

14. For works in the alteration of premises, the remuneration may be increased according to the time, skill and trouble involved.

DUTIES OF THE ARCHITECT.

15. All of the following requirements for buildings are included in the ordinary charge of 5 per cent.:

Preliminary sketches.

Working drawings and specifications sufficient for an estimate and contract.

Detailed drawings and instructions for execution.

General Superintendence of Works (exclusive of Clerk of the Works.)

Examining and passing the accounts, (exclusive of measuring and making out extras and omissions.)

16. No additional remuneration is due for making such a rough estimate as may be obtained, for instance, by cubing out the contents. If a detailed estimate be framed, additional remuneration is due from the Employer.

17. An Architect is bound, under the 5 per cent. charge, to provide one set of drawings and one set of tracings, with duplicate specification; it being understood that the Architect is paid for the use only of the drawings and specification, and that they remain the property of the Architect.

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PER DAY.

24. The charge per day which may be made by Architects depends upon their professional position, but the minimum charge is three guineas per day.

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QUANTITIES.

26. It is not desirable that an Architect should supply to Builders quantities on which to form tenders for executing his design; but in case of such being done, it should be with the concurrence of the Employer, and the Architect should be paid by him and not by the builder.

By authority of the Council,

John P. Seddon, } *Honorary*
[L. S.] Chas. Foster Hayward, } *Secretaries.*

By order Board of Trustees A. I. A.,

P. B. Wight, *Chairman pro tem.*,
A. J. Bloor, *Secretary of Com. on Lib. and Pub.*

Report of the New York Chapter.

To the American Institute of Architects:

The New York Chapter of the American Institute of Architects respectfully report:

That the Chapter was organized at a meeting of the members of the Institute, held on the evening of March 19th, 1867, at the Everett House. The following officers were elected: Richard M. Hunt, President; Leopold Eidlitz and James Renwick, Vice-Presidents; E. T. Potter, Treasurer, and Charles D. Gambrill, Secretary; but, owing to the declination of Messrs. Eidlitz, Gambrill and Potter, Mr. Vaux was, at a subsequent meeting, elected Vice President, Mr. Lienau, Treasurer, and Mr. Bloor, Secretary. Subsequently, Mr. Hunt offered his resignation as President, but it was not accepted. The Chapter has since held four meetings, three regular and one special.

The number of Fellows in the Chapter is at present thirty-two, and of Associates four.

One of the latter resigned shortly after the institution of the Chapter, preparatory to leaving for another part of the country. Four applicants for admission were examined by the Committee on Admission, and recommended to the Chapter. Three of these have been elected, two as Fellows, and one as Associate. Application has been made by three other candidates, who have not yet been examined, and one Associate applies for advance to a Fellowship.

Shortly after the organization of the Chapter, the Executive Committee appointed a Sub-Committee on Rooms, at whose recommendation its present rooms, at No. 42 East Fourteenth Street, Union Square—the most central and eligible location in the city—were hired in the month of May, and furnished with particular reference to conveniences for the display of such of their designs as the members may desire to exhibit currently or from time to time.

The Treasurer's receipts have amounted to $945.00 and his expenditures to $711.14, leaving a balance on hand of $233.86. The revenues are derived from the dues of the members, and the expenses have been for rental, furniture, stationery and sundries

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It will be seen from this glance at the condition of the New York Chapter, that its position and prospects are encouraging not only to itself but to those members of the Institute and others, not residents of our City, who may desire to form societies in affiliation with it. It cannot surely be doubted that the principle of fraternal coöperation is as valuable in architectural science and art as in other spheres; and that where one Chapter will be served all will be helped. The following instance is to the point, and has just occurred in Philadelphia:

Preliminary to the building of a large public structure for the use of the Free Masons in that City, architects had been promiscuously invited, according to the old system, to send in designs at their own expense and risk, remuneration being provided for the successful competitor only. On becoming acquainted with this, a member of the Institute, practising there, produced in the proper quarter, the printed document showing the action of the profession in New York in reply to the Mayor's call on them for advice in relation to the proper preliminaries to the building of the proposed new Post Office, and the effect on the parties in charge of the matter was such, that shortly afterwards, four architects were selected to compete at a remuneration of $1,000 each.

In conclusion, the Chapter joins in a cordial invitation to all members of the Institute, whether members of the Chapter or otherwise, to avail themselves of the accommodations of the latter at their informal evening reunions, which take place every other Tuesday.

CALVERT VAUX,
Vice-President,
ALFRED J. BLOOR,
Secretary.

New York, 1st October, 1867.

Closing Address by Mr. Gilman.

Gentlemen of the Institute:

It can only be with feelings of the liveliest gratification that we have one and all listened to the sketch of the rise and progress of this Society, as we have yesterday heard it from the honored President of our body. Compared with the past,—compared with the state of things which many of us have abundant cause to recollect,—we, of the present day, may feel that we are living in a fortunate time for architecture. The dark, dismal, ignorant days through which the pioneers of our profession were obliged to struggle, and which lasted nearly through the first half of the present century, have now almost entirely passed away, and in looking back over the period which has intervened, so great has been the improvement, so radical the change in the status of our profession, that we can scarcely credit the vastness of the work accomplished. At all events, in view of it, we can wish to use no other terms than those of almost unalloyed gratification.

It has seemed to me that the present occasion offers a fitting opportunity for some extended observations on the relations of our profession to the public, their employers. It is beyond question that a large share of the increased weight of position which our profession now enjoys,—an immense advance, believe me, upon the period when an architect was looked upon as a sort of supernumerary carpenter given to making out figures, perhaps for his own amusement,—is due to the stand so ably and fearlessly taken on several public occasions, by the members of this society. How to elevate the standard and strengthen still further the influence of the architectural profession as a body—one too bound by common interests and actuated by common motives—is a matter which ought to be very near the hearts of all of us who propose to pass our lives in this peculiar service. Upon whatever other points we may disagree—and I suppose that there will always be almost as many sects in architecture as there are in theology, and that disputes will always be as lively and interminable in the one case as in the other—upon this matter which I have selected to address you upon, I think we must all, without exception, find ourselves standing upon one common ground. We may have different tastes, but I am sure that we can have but one common interest,—to rescue the real and substantial work of the profession from the hands of superficial and incompetent bunglers, and to teach the general public that there is a controlling body of educated and intelligent men in the profession, able to give a reason for the faith that is in them, competent to speak with a prevailing weight of good sense upon questions which affect the architectural well-being of the community, and expecting to be recognized and trusted accordingly.

How to bring ourselves into this relation to the public is a question which, you will agree with me, is much more easily asked than satisfactorily answered. It is easier for us of the profession, knowing as we do the general course of our professional difficulties, than for persons in general, to understand how intricate and delicate is the state of facts with which we too often find ourselves compelled to deal. I have sometimes thought that what D'Israeli says of a great general was almost equally true of a thoroughly trained and qualified architect, that he should be a "man at once great in the greatest, and small in the smallest of things," or, as Goldsmith remarks in his *Natural History* in speaking of the trunk of the elephant, "that it is able to rend an oak or to pick up a pin with equal facility." The profession of architecture, unfortunately, perhaps, embraces three entirely distinct and diverse qualifications: it is a union, 1st, of a mechanical trade, or rather of a full knowledge of the proprieties of several of them; 2d, of a mercantile business or agency, having very direct and responsible fiduciary relations with the funds of the employer; and 3d, of a fine art,—in fact, of what Coleridge well calls "the finest of the fine arts" and the most difficult of them all. Now, as we well know, it often happens that proficiency in the two former qualifications gives to some men a standing and a name in the business of the profession, to which they would not have the shadow of a claim if tried by the third and most important of all. If this spurious prestige is further strengthened by the chance to use, in one or two prominent situations, from three to four times the quantity of materials in a building which a sound construction would warrant, or a decent regard for economy would excuse, there is then scarcely any assignable limit to the popular renown of such an achievement and of its astute author. From these and kindred considerations, it is not difficult to understand how it results that the architects who evince the best talent at *getting* commissions are not always the best fitted to *do* them after they have been secured. In fact, I have sometimes been asked, by some of the more thoughtful class of amateurs, whether popular success and general employment in our profession did not seem to follow almost in precise inverse ratio to the degree of merit in the recipient.

It may perhaps be thought the bane of *all* art, that it is so dependent upon the public feeling,—that it flourishes not in proportion always to the degree of talent among its professors, but according to the degree of taste or sensibility for it among other classes of the community. But there can be no doubt that such is really the true state of the case. Particularly will it always be readily admitted by those who know anything of the public mind, that the public, as a body, too often, even the best of them, are very ill-informed in architecture. It is seldom that the means of patronage in their hands are accompanied by that knowledge or judgment which are so necessary to give value to that patronage. Hence it is that we are so often placed in that peculiarly trying position, of attempting to do our best before an uninformed and a perfectly irresponsible tribunal, when we know perfectly well, from the start, that the best is not what will be best appreciated,—in fact, not what is wanted,—and stands no possible chance of meeting with success. And herein lies, I think, the peculiar hardship, the anomalous and sometimes almost helpless position of the architect. The painter can retire to the privacy of his studio, and with his canvass and box of colors,—certainly no expensive outfit,—can paint what he pleases, according to his own fancy of the beautiful; as crazily sometimes, if you please, as his wildest whims can dictate; and somebody comes along and buys it; his nonsense, as king Charles said of the preacher, just hits their nonsense,—the crazier perhaps the better for the quality of the patrons,—and the finished picture, bought and taken away; whether it ever ought to have been produced or not, is quite another question; but the completed picture is the end of the matter so far as he is concerned. It is all in the painter's own hands, the child of his own uncontrolled wishes, and he alone is responsible for it, from first to last. So with the sculptor, the impediment of tools and clay being in his case, perhaps, even of less account than the canvass and colors of the former. But when we come to the labors of the architect, how different, how infinitely more embarrassing are the conditions? He can put nothing into the permanent form of a building,—can produce nothing that shall be seen and known and read of all men as his finished and completed work, except by the consent, with the coöperation, and at the expense—the large expense often—of other people. His work must be passed on before it is fairly begun, and stands no possible chance of ever coming even to a successful beginning,—in a permanent form, I mean,—unless the people who are to *pay* have been all along previously conciliated. And you can readily understand that, should he have independence enough, or occupy a position strong enough to say, from the start, that he will design nothing, draw nothing, specify nothing, superintend nothing, put his hand to nothing but what he fully approves and what he knows beforehand is just the very best thing to be done, it would result, ninety-nine times in a hundred, in his being abandoned by his employers and the general public, as in their view only a crotchetty, impracticable and conceited abstractionist. And it is my opinion,—I do not mean to dogmatize on the point,—but certainly in my own long and well considered opinion on this question, half a dozen such cases of professional self-assertion would render any one of us practically *hors du combat* for any important work for the balance of our natural lives. The late Sir Charles Barry, whom we all of us, I take it, look upon as a tolerably successful man in the profession, once remarked to me in speaking of Dr. Reid and his attempted ventilation of the Parliament buildings, with a warmth of feeling and an energy of expression which I never saw this most amiable man exhibit on any other subject: "The world," said he, "can never know, and nobody but a professional architect, perhaps, would ever believe the amount of arrogance, of supercilious interference, of downright brutality even, that I have all all along been subjected to in this matter. Forty times I have been on the point of throwing it up altogether, and had it not been for Lady Barry and my son, who have had little else to do but quiet me down at home, I should long ago have done so." I was sorry that I did not think to remind him of what I remembered not long after, of a letter of the Duke of Wellington, printed in in Colonel Gurwood's edition of his letters and despatches. It was written to a young subaltern officer in India, the son of an old friend of the Duke, who contemplated throwing up his commission on account of some treatment he had received at the War Office. The veteran remonstrated with him, as nearly as I remember, in these effective terms: "You are dissatisfied with your treatment, and perhaps justly, but it is what we are all liable to in this world. The nation, doubtless, thinks me a man accustomed to have things pretty much as he likes, but I assure you, my young friend, that in thirty years of service, *I have never had one single thing just as I wanted to have it*. I have been obliged always to do the best I could under the circumstances."

Perhaps a fair illustration of the position of the architect, in relation to his employers, may be had by a comparison of it with that of the legal advocate. The lawyer, in conducting the management of a case is compelled to take the facts as he finds them, and to do the best he can with the argument, under their admitted or proved relations. Could he have the power to make his own facts in every case just as he would like to have them, it would scarcely be granting him an easier task than what some architects appear to expect is going always to fall to their lot. The requirements of locality and convenience are one part of the facts of one class of cases which may often, it is true, admit of some ingenious modification at the hands of the architect, and perhaps greatly to the benefit of all concerned. But there is a second and often a harder class of facts to contend with, and this is the tastes, the wishes, often the fixed and unalterable resolutions of the employer; and just how to keep the line between what we know to be right and what he declares to be admissible, how,—in the language of the compilers of the Book of Common Prayer,—"to keep the mean between too much readiness in accepting and too much stiffness in refusing," this is the true *crux*, the veritable *pons asinorum*, which, when I confess myself to this day, and after three and twenty years of active practice, to be often sorely puzzled to cross with dignity I know that I shall be by no means alone in the feeling in this assembly.

How shall we play then to those that will not hear? How pipe to those who neither know nor care how to dance to our genteelest tunes? It is but weary work for us to go on telling people that they know nothing of architecture, and in the same breath expect them and call upon them to encourage it. We might as well expect a deaf person to spend his money in patronizing concerts of music, or look for a blind party to fill his house with pictures and to set up for a superior judge of colors. "Unless there are minds," says Mr. Leeds, "capable of appreciating them, the immortal designs of Raffaelle are little more than so much old canvass or paper,—the sublime sculptures of the Parthenon, than so many defaced and battered stones. Without some congenial minds, some kindred faculties in those around him, the artist, let his particular calling be what it may, is forced to breathe in a withering atmosphere. His genius may bud, but it will be only to be blighted, and however fair may be the creations of his fancy, though they may be in themselves a paradise of art, yet it will be one of which irrational animals only are the spectators."

Candidly then, gentlemen, it is to the position taken by this Institute, and to the wise and beneficient measures inaugurated and urged on the general community by our own body, that I look mainly for the future improved position of the profession, and for the gradual education of the public taste in all that relates to our complicated and fascinating art. I may say now what I have never lost an opportunity of saying both in private and public, that I consider it a great privilege,—the greatest privilege in fact that can belong to the professional architect,—to become a member of this body, and thus to be permitted to aid individually as well as collectively, in the great work which we have to do. The harvest is bounteous before us, but this Institute is a machine which possesses a reaping power, in my opinion, abundantly adequate to the work. Presenting a uniform and united front to the public, I see no limit to the influence and authority of this body in regard to all that concerns the relations between them and their employers. Let us be heard from on all occasions of public interest. Let us seek every opportunity to enter the arena on all questions that arise, or that can be *made* to arise, touching the interests and the advancement of our art. Let the Institute be polemical, missionary and aggressive. Let her be on the alert to grasp every instrument and to echo every cry. I would have every man, woman and child in the country made to know that there is such a body as the Institute, much as they know that there is a Court of Appeals, and my word for it, it will not be many years before our decisions will carry nearly the same weight with them in all architectural matters as the decisions of that Court do in purely legal affairs. *Nobody knows enough to contradict us on our own ground*, if we are only united, nor could they find a leg to stand on in the way of argument, if they did. Herein lies the true secret of our strength. Let us be wise enough to be willing to use it. Reasoning only from what has been accomplishd in the past,—just as statisticians do of the growth of a city,—it is easy to predict that ten years more will enable the increased influence of this society to exert a preponderating weight of authority upon every one of the subjects which now arise to vex our equanimity, and to harrass our professional peace.

In this point of view I think we should all feel specially solicitous to secure the active co-operation of all the reputable members of the profession in all our American cities. Let us smoothe the way as much as possible to a cordial and complete union throughout the country. Let us urge all who have the advancement and standing of the profession at heart to work heartily together to this end, without vanity or without jealousy, here or anywhere. If there are any objections, let them be met and toned down; if there are any misconceptions, let them be fraternally argued and explained away. And with this complete accord of feeling and practice, with this unanimity of aim of the whole profession, believe me, that many-headed antagonist—the public, —will make haste to give up the unequal contest, when he finds a compacted band of trained marksmen pointing straight at his positions from every quarter of the compass.

I remains for me, gentlemen, to say a few words regarding that natural enemy of our profession, that bane of all taste, that nemesis of common honesty, and wet blanket of all true art, the so-called "practical architect." We all of us know and have had occasion to run against the men of this class.* They are generally, I believe, men who have failed in business as builders, or as Real-Estate speculators, and who have taken up Architecture as a *dernier resort*, or as being perhaps a trifle more genteel than their former business. These men style themselves, *par excellence*, practical architects, and consequently as this is said to be a practical age, a practical people, etcetera, these men often do the larger share of the really important business of the profession. Their knowledge of architecture, so far as my observation of them extends, has generally been got in this way. During their practice as builders, whenever they have been called upon to build from a regular set of plans, after finishing the building, instead of returning the plans to the architect (to whom of course they rightfully belong), they have themselves kept them, and by pursuing this course for a number of years they will have accumulated quite a stock in trade. During this time also, by employing their leisure hours in conning over and copying these plans again and again, by stealing elsewhere, as occasion offers, from buildings in progress,—once I have caught one of them "scribing off" an interior cornice in one of my houses, that had cost me three days of careful elaboration, before the plaster was fairly dry,—and they will have obtained some pretense of knowledge of what they call "drafting." Finally, having failed in business once more, for the very last time, after buying Mr. Sloane's books,—and perhaps Peter Nicholson, and Lefevre on hand-railing, in some cases even "studying" for two or three months with one of their own class who has got on a little farther in the race of humbug,— and they come out as full-blown architects, with an office, a shingle, and large retinue of waiting and admiring clients.

Such having been their course of study, their practice is generally in this wise. They persuade some young man, who has just finished studying the profession legitimately, and who is possessed of talent, but who is destitute of friends, or any great amount of means, to go into their office, either as junior or silent partner, or as draftsman, and while he attends to the artistic part of the business, they attend to the "practical" part. That is to say, they take precious good care that the poor assistant shall be kept well in the back-ground, so that whenever anything supposed to be creditable is done, they themselves get all the benefit of it, and when a separation takes place, which generally happens soon, as it is rarely that the human nature in the assistant can stand the swollen self-complacency and egotistical assumption of his principal for more than six months at a time,—the senior partner claims, and usually succeeds in keeping all the designs and copies of the plans that have been made, and uses them as the ground-work for future designs.

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*A most excellent "Letter to a Father on the Choice of his Son's Profession as an Architect," by Edwin Lee Brown, Esq., now of Chicago, was printed several years since in the Boston Transcript, to which the writer is largely indebted for this description.

These men work for any price rather than lose a job. But woe to the unfortunate client who employs them to "draft a plan" for him without stipulating beforehand the price, and the amount and quantity of work to be done. They can do a great deal of work, for two reasons: first, because they can always command an abundance of "students" from their reputation as "*practical* architects," whom they can profitably employ to do all the drudgery, and, in fact, to make most of their designs; and, secondly, because they make fewer and infinitely more indefinite plans than the regular practitioner. Instead of plans and elevations neatly drawn and carefully figured; instead of stone and framing plans drawn in the most thorough manner, and every detail drawn out at full size, so that sometimes, as we all know, the drawings for a single large building are counted by hundreds; instead of matured specifications of pages in length, whose items describe in the fullest and most exact manner all the work to be done; instead of all the plans, specifications, and contracts being signed and identified by the contracting parties before the work is commenced,—the "practical architect" palms off upon his employer a dozen hasty drawings in pencil, to a small scale,—a specification, as I have often seen them, not fairly covering a single sheet of fool's cap, *and often no contract at all*,—relying merely on verbal agreements with the mechanics, with a perfectly well understood bonus to himself, of from 5 to 10 per cent as the fundamental consideration. I have known such men never to make a detail drawing until the workmen have waited for it a week or more, and then to roughly scratch it out on a board on the spot, handing it to the men with a muttered curse for their presumed stupidity in not being able to get on with their work without a word of explanation. Is it any wonder that such an "artist" alters, re-alters and alters back again nearly the whole of his meagre ideas during the progress of the work, or that he almost invariably, by these means, makes his buildings cost almost double the sum first placed at his disposal for their erection.

On all such practitioners as these—and who among us does not know them, gentlemen, to his cost—let our correct and high-toned society set the brand of its ineffacable contempt. The "practical architect" is a quack, and gains success as quacks gain success. His ways are their ways. He professes to accomplish everything better, quicker and cheaper than any body else, but, of course, he does exactly the reverse. So alert, unscruplous and dangerous an enemy is he, however, that I fear his influence is the last of those things that make against our peace, that will ever be successfully met and overthrown by any efforts of ours. But whenever and wherever we meet him, let us at least scorn to give him any quarter.

I hope that these observations, upon the present state of the profession, gentlemen of the Institute, will be received with as much frankness as they are given. They are, indeed, but individual utterances, but I trust there is nothing advanced in them which the majority of you will not be willing to endorse and approve. Whenever the fine arts exert a really profitable influence, they act, I think, by increasing those sources of reasonable pleasure by which the mind is neither degraded nor enfeebled, nor depraved. That a love for them, and for architecture in particular, may be made to produce a most beneficial effect on the public mind, cannot, I think, be doubted, for there can be no greater source of good to the whole community than the multiplication of such refined gratifications. But when the fine arts are allowed, in any manner, to become the subjects of contention, then the office which they should possess, is frittered away, counteracted and lost. The brightest productions of art,—the works even of Phidias, or of Raphael—would become valueless, almost despicable even, did they tend to increase the causes of difference between those who ought to work together for the general advancement of the good of mankind. We are already, as a community, furnished with too many causes of opposition, arising out of more gross and material matters,—but, at all events, (to use the words of the late Lord Elgin) "Let us avoid imitating children, let us not quarrel also about our pleasures, our playthings and our toys." Let us agree in using those means which make for our common good, with taste, with tact, with moderation and with sense,—that

> "Good sense, which only is the gift of heaven,
> And though no science, fairly worth the seven."

New York, October 23, 1867.

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AMERICAN INSTITUTE OF ARCHITECTS.

FIRE-PROOF FLOORS

FOR

Banks, Insurance Companies, Office Buildings and Dwellings,

TABLES,

Shewing the Distances from Centres at which Rolled Iron Beams should be placed, and the weight of Metal per superficial foot of the Floor.

By R. G. HATFIELD, F. A. I. A.

At a meeting of the Committee on Library and Publications of the American Institute of Architects, held May 18th, 1867, it was

Resolved, "That this Committee request Mr. R. G. Hatfield to furnish for publication the results of his experience in the strength of iron beams and other matters containing useful information for Architects; and to let this Committee know in what form he would prefer to have them published."

In compliance with the above resolution, the following paper has been prepared and is respectfully submitted:

With the growth of our country in population and wealth, the business and importance of our financial institutions have increased, and they now demand more safe and enduring structures to serve as the depositories of their valuable records and effects.

The use of iron beams in fire-proof floors is comparatively recent, especially those made of malleable iron. By their introduction the brick arches or vaultings have been rendered much lighter, require less space and cost less money.

In proportion as metal is more expensive than wood, so is the importance greater of ascertaining the minimum amount of material required in the beams. Investigations made in reference to this subject have, some time since, resulted in showing that the best form of section was that in which the material is concentrated at the top and bottom of the beam, leaving as a web or connection only so much of the material as may be needed to constitute a firm bond of connection between the two masses at top and bottom.

In these investigations, the names of Tredgold, Barlow, Hodgkinson, Stephenson, Fairbairn and others are prominent. Hodgkinson showed that, in cast iron, the relative proportion between the top and bottom flanges, in order to economise the material, should be as 1 to 6. And Stephenson, in his experiments preliminary to the erection of that successful achievement of science, the tubular bridge over the Menai Strait, showed that the top and bottom flanges, in wrought iron, should be about equal. And, based upon this result, are the proportions which are found in the rolled iron beams now in such common use with us.

The form of the beam being established, the next most desirable point to know is its strength. With what weight may a rolled iron beam of given size be safely trusted? Experiments to test this have frequently been made, but the larger portion of them were to show the absolute strength or resistance to *rupture*. A knowledge of this kind of resistance is important in cast iron, but in wrought iron it is not so important as a knowledge of the power to resist *deflection*. By a knowledge of the power of a beam to recover itself after removal of the load, are we enabled to ascertain what load may

Entered according to Act of Congress, in the year 1868, by R. G. Hatfield, in the Clerk's Office of the District Court of the United States, for the Southern District of New York.

be placed upon it without injury to the integrity of the metal, and thus may its endurability be secured.

This want in the knowledge required has been supplied in some degree heretofore, but nothing coming under my observation has been of equal importance with the very careful experiments, upon a large scale, made at the Trenton and Phœnix Iron Works respectively, as more fully stated below. By these tests, the elastic power and limit of the metal were fairly developed, and the results give life and power to the formula by which the capacity of the various sized beams is ascertained.

With the best form of section, and the limit of elastic power established, there is still at least one more difficulty in the practical application of this knowledge. It is, in the fact that we are so liable, when, in the hurry of professional duties,—called upon to assign the kind and size of beam for any given case,—to arrive at an erroneous result in consequence of omitting some of the conditions of the problem; or, sometimes even, by false arithmetical operations From a consideration of this liability to error, and with the hope of effecting an ultimate saving of time, I was led, some time since, to so reduce the formula as to make it applicable to all sizes of beams; and, suitable for the floors of all the more important buildings; and, then to make extensive computations and tabulate the results. The attempt to make such tables was made some years since, but owing to the want of the requisite leisure, not only to make but to revise them, their completion has been accomplished only very recently, and I now have the pleasure of presenting them herewith for your consideration.

The first of the following tables shows the distance from centres at which the rolled iron beams are to be placed in fire-proof floors, having brick arches and wooden floor plank laid upon wood strips bedded in concrete, levelled up upon the arches. And the second table shows the weight of metal per superficial foot of the floor, when the beams are distributed as required in the first table.

In the second table the weight of metal was ascertained by computation from the equation,

$$m = \frac{r}{3c},$$

in which r equals the weight in pounds of the beams per yard, and c equals the distance from centres in feet at which the beams are placed as required in the first table, and m equals the weight of metal per superficial foot.

In the first table the distances from centres were computed from the equation,

$$c = 22{\cdot}044\,\frac{I}{l^3} - \frac{r}{405},$$

where I is in inches, l in feet, and r in pounds. This equation is derived from the well-known formula

$$\delta = \frac{wl^3}{EI},$$

in which δ=the deflection; w equals the weight; l, the length; I, the moment of inertia; E, the constant representing the elastic power of the material; r, the weight in pounds of the iron beam per yard lineal; and c, the distance from centres, in feet, at which the beams are to be placed.

The tables have been made with care from independent computations, and the results compared by differences. In determining the dimensions of the section of each beam, from which to derive the value of I, care was taken to adjust the decimals of the dimensions of the parts so that the area of the section in inches should be just equal, by computation, to one tenth of the weight in pounds of the beam per lineal yard; ten pounds being the weight per yard of a bar of rolled iron one inch square. Much care has also been taken to ascertain the value of E, the symbol denoting the elastic power of the metal. The results of some experiments to test the elastic power of rolled iron beams, made in 1859 by Major Robert Anderson, the hero of Fort Sumter, for the Trenton Iron Works, were kindly placed at my disposal in 1864, by Mr. Edward Cooper, one of the proprietors of those works; and the results of similar experiments made in 1861, for the Phœnix Iron Company of Philadelphia, were as kindly furnished me a year since, by Mr. Sam'l J. Reeves, Vice-President of the Company.

The experiments by Major Anderson were made upon two 6 inch beams, 12 and 16 feet long, respectively, and on four 9 inch beams, 21 feet long each. The Phœnix Iron Company's tests were upon one 12 inch beam, 28 feet long, and one 15 inch beam 27 feet long. The results obtained from these eight beams differ but little, the experiments doubtless having been carefully made. From the fact that these experiments were carefully made and upon so large a scale, the results are deemed important and trustworthy, and, accordingly, have been used as data, from which to obtain the value of the constant for elasticity in the formula from which these tables have been computed.

In determining the load upon the beams, the strain has been taken as great as it will perhaps ever be in buildings of the class for which these tables are intended; and is composed of three pressures, namely: one from the weight of the iron beams, one from the weight of the brick arches, concrete, plastering and wooden floor, and the third from the weight of the superimposed load. The weight of the iron beams varies much, but as it enters the formula as a variable, not as a constant, its exact amount is ascertained in each case. The weight of the brick arches and other material entering into the construction of the floor, does not vary greatly, and is taken in the formula at 69 pounds per superficial foot of the floor, an amount sufficiently high to cover the heavier kinds of work.

The superimposed load is assumed at 66 pounds per foot superficial of the floor. This is the weight which has been established by computation and experiment, as arising from a crowd of people, and is fully equal to any load which the floors of this class of buildings will be required to sustain. But, in case by any possibility, the load should exceed this, still the elastic limit of the metal will not have been reached, when placed as required in the first table, before the superimposed load shall have been increased to at least twice 66 pounds per foot superficial. But the deflection caused by such an increase of load will be more than ought to be allowed where regard is had for the appearance of the work.

The deflection allowed in the tables is 0.03 inch per foot of the length of the beam, or, one inch in 33⅓ feet. This will be the deflection, when the floor is loaded with people or with an equivalent weight of 66 pounds per superficial foot. More than half of this deflection, however, is due to the weight of construction, that is, the weight of the iron beams, brick arches, &c., which amounts to 80 or 100 pounds, causing a deflection, in the absence of any superimposed load, of about 0.017 inch per foot. From this it will be seen that the deflection will not be doubled by doubling the *superimposed* load; for the deflection will not be doubled until the *total* load is doubled, and so of any other proportion; the deflections always being in proportion to the total loads.

These are the results from an increase of load while the distances from centres, as given in the table, are adhered to; but, if, when the load increases, the distances from centres are made to decrease in like proportion, the deflection will remain constant, hence the tabular distances from centres are useful in determining the distance from centres for any given weight in any given case. For in general, if the tabular distance from centres is multiplied by the total weight of the load required by the table, and the product divided by the total weight in the given case, the quotient will be the distance from centres at which the beams should be placed to sustain the given load without an increase in the deflection of the table. For example, let it be required to ascertain the distance from centres at which the Buffalo 9 inch, 90 lbs. beams 17 feet long ought to be placed to sustain upon them 250 instead of 66 pounds per superficial foot. The total load here, as required by the table, is, $66+69+5.31=140.31$, say 140 lbs. In the given case, assuming the weight of metal at say 2½ times that of the table, or 13 lbs., the total load is $250+69+13=332$ lbs. The tabular distance from centres is 5.65 ft. Therefore,

$$\frac{5{\cdot}65\times140}{332} = 2{\cdot}38 \text{ ft.},$$

or 2 ft. 4½ inches, the required distance from centres. And so in like manner the distance from centres may be obtained for any desirable load.

The tables are limited to the principal beams of this country. At some future day I may be able to submit tables of foreign beams. The 8 and 10½ inch beams of the table are new, they are introduced at my suggestion. Beams of these sizes have been much needed.

It may be remarked that the beams of the Trenton Iron Works are made by machinery, capable of producing beams of greater or less thickness of web and width of flanges, and consequently differing in weight and strength. The beams of the table are their *standard* beams. They will furnish beams to order, either heavier or lighter, within certain limits.

Use of the Tables.—Table I. The first table shows how frequent the beams are required to be placed in any given floor; or, when their frequency has been assumed, shows what size beams are suitable.

First.—To find the distance from centres when the kind of beam has been fixed upon, by—

TABLE I.

DISTANCES FROM CENTRES, IN FEET.

(Load, 66 pounds per square foot.)

NAME.	BEAM.		LENGTHS BETWEEN BEARINGS, in feet.																																
	DEPTH, in inches.	WEIGHT PER YARD in pounds	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PHŒNIX,	6	40	17·18	11·48	8·03	5·83	4·35	3·33	2·60	2·06	1·66	1·35	1·11																						
TRENTON,	6	40	18·23	12·18	8·52	6·19	4·62	3·54	2·76	2·19	1·76	1·43	1·18																						
BUFFALO,	6	40	18·23	12·18	8·52	6·19	4.62	3·54	2·76	2·19	1·76	1·43	1·18																						
BUFFALO,	6	50	22·29	14·89	10·42	7·56	5·65	4·33	3·38	2·68	2·15	1·75	1·44	1·19																					
TRENTON,	6	50	22·29	14·89	10·42	7·56	5·65	4·33	3·38	2·68	2·15	1·75	1·44	1·19																					
PHŒNIX,	7	60	.....	22·91	16·05	11·66	8·72	6·68	5·23	4·15	3·35	2·73	2·25	1·88	1·57	1·33																			
TRENTON,	7	56	.....	22·95	16·07	11·68	8·74	6·70	5·24	4·17	3·36	2·75	2·27	1·89	1·58	1·34																			
BUFFALO,	7	60	.....	23·61	16·54	12·02	8·99	6·89	5·39	4·28	3·46	2·82	2·33	1·94	1·63	1·37	1·17																		
BUFFALO,	8	65	.....	.....	22·68	16·49	12·35	9·47	7·42	5·91	4·77	3·90	3·23	2·69	2·27	1·92	1·64	1·40																	
BUFFALO,	9	70	.....	.....	.....	21·51	16·12	12·37	9·69	7·73	6·25	5·12	4·24	3·54	2·99	2·54	2·17	1·86	1·61																
TRENTON,	9⅛	65	.....	....	.....	22·24	16·67	12·80	10·03	8·00	6·47	5·31	4·40	3·68	3·10	2·64	2·26	1·94	1·68																
PHŒNIX,	9	75	.....	.....	.....	24·20	18·14	13·93	10·91	8·70	7·04	5·77	4·78	4·00	3·37	2·86	2·45	2·10	1·82	1·58															
BUFFALO,	9	90	.....	.....	.....	.....	21·46	16·48	12·92	10·30	8·33	6·82	5·65	4·73	3·99	3·39	2·89	2·49	2·15	1·87	1·62														
TRENTON,	9⅛	84	.....	.....	.....	.....	21·77	16·72	13·11	10·45	8·46	6·93	5·74	4·81	4·06	3·45	2·95	2·54	2·20	1·91	1·66														
PHŒNIX,	9	89	.....	.....	.....	.....	22·02	16·91	13·25	10·57	8·55	7·01	5·80	4·85	4·09	3.48	2·98	2·56	2·21	1·92	1·67														
TRENTON,	10½	100	.....	.....	.....	.....	.....	.....	21·55	17·20	13·94	11·44	9·50	7·96	6·73	5·74	4·92	4·25	3·69	3·22	2·82	2·48	2·19	1·93											
BUFFALO,	10½	105	.....	.....	.....	....	.....	.....	21·84	17·43	14·12	11·59	9·62	8·06	6·82	5·81	4·98	4·30	3·73	3·25	2·85	2·50	2·21	1·95											
PHŒNIX,	9	150	.....	.....	.....	.....	.....	.....	22·54	17·97	14·54	11·92	9·87	8·26	6·97	5·92	5.06	4·36	3·77	3·27	2·85	2·49	2·19	1·92	1·69										
PHŒNIX,	12	125	.....	.....	.....	.....	.....	.....	.....	.....	20·72	17·01	14·13	11·86	10·04	8·56	7·35	6·35	5·52	4·82	4·23	3·73	3·30	2·92	2·60	2·32	2·07								
TRENTON,	12¼	124	.....	.....	.....	....	.....	.....	.....	.....	21·89	17·98	14·94	12·54	10·61	9·06	7·78	6·73	5·85	5·11	4·49	3·96	3·50	3·11	2·76	2·47	2·21								
BUFFALO,	12¼	125	.....	.....	.....	.....	.....	.....	.....	.....	22·11	18·16	15·09	12·66	10·72	9·15	7·86	6·80	5·91	5·16	4·53	4·00	3·53	3·14	2·79	2·49	2·23								
TRENTON,	12¼	180	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22·11	18·55	15·71	13·40	11·52	9·96	8·66	7·56	6·65	5·86	5·18	4·60	4·10	3·66	3·27	2·94	2·64	2·37	2·14				
BUFFALO,	12¼	180	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	22·11	18·55	15·71	13·40	11·52	9·96	8·66	7·56	6·65	5·86	5·18	4·60	4·10	3·66	3·27	2·94	2·64	2·37	2.14				
BUFFALO,	15	150	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21·91	18·57	15·87	13·66	11·83	10·31	9·03	7·95	7·02	6·23	5·55	4·96	4·44	3·99	3·59	3·25	2·94	2·66				
PHŒNIX,	15	155	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	22·62	19 17	16·38	14·10	12·21	10·64	9·32	8·20	7·25	6·43	5·73	5·12	4·59	4·12	3·71	3.35	3·03	2·75				
TRENTON,	15	155	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24·09	20·42	17·45	15·03	13·02	11·35	9·94	8·75	7·74	6·87	6·12	5.47	4·90	4·41	3·97	3·59	3·25	2·94	2·68			
PHŒNIX,	15	200	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	21·96	18·90	16·38	14·27	12·50	11·00	9·73	8·63	7·69	6·87	6·16	5·54	4·99	4·50	4·08	3·69	3·36	3·05	2·78	2·53
BUFFALO,	15	200	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22·28	19·18	16·62	14.48	12·69	11·17	9·87	8·76	7·81	6·98	6·25	5·62	5·07	4·58	4·14	3·76	3·41	3·10	2·83	2·58
TRENTON,	15	200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22·59	19·45	16·85	14·69	12·87	11·33	10·01	8·89	7·92	7·08	6·35	5·71	5·14	4·65	4·20	3·81	3·46	3·15	2·87	2·62

TABLE II.

WEIGHT OF METAL PER FOOT SUPERFICIAL OF FLOOR, IN POUNDS.

NAME.	BEAM.		LENGTHS BETWEEN BEARINGS, in feet.																																
	DEPTH, in inches.	WEIGHT PER YARD, in pounds	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PHŒNIX,	6	40	·78	1·16	1·66	2·29	3·07	4·00	5·13	6·47	8·03	9·88	12·01																						
TRENTON,	6	40	·74	1·10	1·58	2·17	2·90	3·80	4·87	6·12	7·62	9·39	11·40																						
BUFFALO,	6	40	·73	1·09	1·56	2·15	2·89	3·77	4·83	6·09	7·58	9·32	11·30																						
BUFFALO,	6	50	·75	1·12	1·60	2·20	2·95	3·85	4·93	6·22	7·75	9·52	11·57	14·09																					
TRENTON,	6	50	·75	1·12	1·60	2·20	2·95	3·85	4·93	6·22	7·75	9·52	11·57	14·00																					
PHŒNIX,	7	60	....	·87	1·25	1·72	2·29	2·99	3·82	4·82	5·97	7·33	8·89	10·64	12·74	15·04																			
TRENTON,	7	56	....	·81	1·16	1·60	2·14	2·79	3·56	4·48	5·56	6·79	8·22	9·88	11·81	13·93																			
BUFFALO,	7	60	....	·85	1·21	1·66	2.22	2·90	3·71	4·67	5·78	7·09	8·58	10·31	12·27	14·60	17·09																		
BUFFALO,	8	65	....	....	·96	1·31	1·75	2·29	2·92	3·67	4·54	5·56	6·71	8·05	9·54	11·28	13·21	15·48																	
BUFFALO,	9	70	....	....	....	1·08	1·45	1·89	2·41	3·02	3·73	4·56	5·50	6·59	7·80	9·19	10·75	12·54	14·49																
TRENTON,	9⅛	65	....	....	....	·97	1·30	1·69	2·16	2·70	3·35	4·08	4·92	5·89	6·99	8·21	9·59	11·17	12·90																
PHŒNIX,	9	75	....	....	....	1·03	1·38	1·79	2·29	2·87	3·55	4·33	5·23	6·25	7·42	8·74	10·20	11·90	13·74	15·82															
BUFFALO,	9	90	....	....	....	....	1·40	1·82	2·32	2·91	3·60	4·40	5·31	6·34	7·52	8·85	10·38	12·05	13·95	16·04	18·52														
TRENTON,	9⅛	84	....	....	....	....	1·29	1·67	2·14	2·68	3·31	4·04	4·88	5·82	6·90	8·12	9·49	11·02	12·73	14·66	16·87														
PHŒNIX,	9	89	....	....	....	....	1·35	1·75	2·24	2·81	3·47	4·23	5·11	6·12	7·25	8·52	9·96	11·59	13·42	15·45	17·76														
TRENTON,	10½	100	....	....	....	....	....	....	1·55	1·94	2·39	2·91	3·51	4·19	4·95	5·81	6·78	7·84	9·03	10·35	11·82	13·44	15·22	17·27											
BUFFALO,	10½	105	....	....	....	....	....	....	1·60	2·01	2·48	3·02	3·64	4·34	5·13	6·02	7·03	8·14	9·38	10·77	12·28	14·00	15·84	17·95											
PHŒNIX,	9	150	....	....	....	....	....	....	2·22	2·78	3·44	4·19	5·07	6·05	7·17	8·45	9·88	11·47	13·26	15·29	17·54	20·08	22·83	26·04	29·59										
PHŒNIX,	12	125	....	....	....	....	....	....	....	....	2·01	2·45	2·95	3·51	4·15	4·87	5·67	6·56	7·55	8·64	9·85	11·17	12·63	14·27	16·03	17·96	20·13								
TRENTON,	12¼	124	....	....	....	....	....	....	....	....	1·89	2·30	2·77	3·30	3·90	4·56	5·31	6·14	7·07	8·09	9·21	10·44	11·81	13·29	14·98	16·73	18·70								
BUFFALO,	12¼	125	....	....	....	....	....	....	....	....	1·88	2·29	2·76	3·29	3·89	4·55	5·30	6·13	7·05	8·07	9·20	10·42	11·80	13·27	14·93	16·73	18·68								
TRENTON,	12¼	180	....	....	....	....	....	....	....	....	....	....	2·71	3·23	3·82	4·48	5·21	6·02	6·93	7·94	9·02	10·24	11·58	13·04	14·63	16·39	18·35	20·41	22·73	25·32	28·04				
BUFFALO,	12¼	180	....	....	....	....	....	....	....	....	....	....	2·71	3·23	3·82	4·48	5·21	6·02	6·93	7·94	9·02	10·24	11·58	13·04	14·63	16·39	18·35	20·41	22·73	25·32	28·04				
BUFFALO,	15	150	....	....	....	....	....	....	....	....	....	....	....	2·28	2·69	3·15	3·66	4·23	4·85	5·54	6·29	7·12	8·03	9·01	10·08	11·26	12·53	13·93	15·38	17·01	18·80				
PHŒNIX,	15	155	....	....	....	....	....	....	....	....	....	....	....	2·28	2·69	3·15	3·66	4·23	4·85	5·54	6·29	7·12	8·03	9·01	10·08	11·26	12·53	13·93	15·38	17·01	18·80				
TRENTON,	15	155	....	....	....	....	....	....	....	....	....	....	....	2·14	2·53	2·96	3·44	3·97	4·55	5·20	5·90	6·68	7·52	8·44	9·45	10·54	11·72	13·01	14·39	15·90	17·57	19·28			
PHŒNIX,	15	200	....	....	....	....	....	....	....	....	....	....	....	....	....	3·04	3·53	4·07	4·67	5·33	6·06	6·85	7·72	8·67	9·70	10·82	12·03	13·36	14·81	16·34	18·07	19·84	21·86	23,98	26·35
BUFFALO,	15	200	....	....	....	....	....	....	....	....	....	....	....	....	....	2·99	3·48	4·01	4·60	5·25	5·97	6·75	7·61	8·54	9·55	10·67	11·86	13·15	14·56	16·10	17·73	19·55	21·51	23·56	25·84
TRENTON,	15	200	....	....	....	....	....	....	....	....	....	....	....	....	....	2·95	3·43	3·96	4·54	5·18	5·88	6·66	7·50	8·42	9·42	10·50	11·68	12·97	14·34	15·87	17·50	19·27	21·16	23·23	25·44

Rule I.—In the horizontal column, having at the left hand the name and size of the beam, and at its intersection with the vertical column headed with the length of the beam, will be found the distance apart from centres at which the beams are to be placed. The dimensions are in feet and decimals of a foot. The length of the beam is the length in the clear of the bearings.

Example.—For Buffalo, 9 inch 90 pound beams, 22 feet clear of the bearings, what is the required distance from centres? In the horizontal column, having at the left Buffalo 9·90, and at its intersection with the vertical column headed with 22, is found 2·49, or 2 ft. 6 inches nearly, the required distance from centres.

Second.—To find what beam is required in any case where the distance from centres has been assumed, by—

Rule II.—In the vertical column, headed with the length of the beam in the clear of the bearings, find the distance from centres given, or that which is nearest to the given distance, and then at the left, in the horizontal column containing this distance, will be found the name, height and weight of the required beam. When two or more beams give the same or nearly the same distance from centres, by reference to the second table, the amount of metal per superficial foot of the floor will be found for each beam, and this may show which of the beams it would be preferable to select. The beam of lightest weight will have the thinnest web. Care is required, therefore, in the selection, not to take one having a web so thin as to lack the requisite stiffness.

Example.—What beam ought to be chosen for a floor having a clear bearing of 25 feet and where the beams are required to be placed about 4 feet from centres? In Table I, under 25, there are three beams, either one of which would be suitable for this case. The Phœnix 12, 125, at 4.23 feet from centres; the Trenton 12¼, 124, at 4.49 ft., and the Buffalo 12¼, 125, at 4.53 feet. By reference to Table II, the weight per superficial foot of the three beams is seen to be 9.85, 9.21, and 9.20 pounds respectively. Either of these beams may be taken, as economy of metal, height or other considerations may seem to direct.

Table II.—The second table, besides the use as shown above, is of service in estimating approximatively the amount of iron required in any given floor, by—

Rule III.—In the vertical column, headed with the length of the beam in feet, clear of the bearings, and at the intersection of the horizontal column, having at the left the name of the beam selected, is found the weight of metal per superficial foot of the floor. Multiply this by the area of the floor and the product will be the weight of metal required. In taking the area of the floor it is necessary to take the width equal to the entire length of the beams. *Example.*—What amount of metal will be required for the floor of a room 21 by 50 feet, having Phœnix 9 inch 75 lbs. beams, the beams resting 9 inches on each wall. The table weight of metal for this case, found as directed in Rule III, is 10.2 lbs. The area of the floor, extended to cover the ends of the beams in the walls, is 22½ × 50 = 1,125 ft., and this multiplied by 10.2 = 11,475 lbs., the weight required.

Girders.—These tables may be used to find what girders are required for fire-proof floors. The distance between the lines of columns, or between a line of columns and a wall, is to be taken as the distance from centres. If the distance to the next bearing upon one side of the girder is greater than on the other side, then take the average of the two distances. If in the table, there is no distance from centres great enough, then take *half* the required distance, and in this case take *two* beams and bolt them together to form the girder, or take one-third the distance and three beams for the girder, and so for any other proportion of the distance. To find the required girder, proceed as in *Rule II.* *Example.* What beam or beams is required for a girder 15 feet long, clear of bearings, and where the distance to the next bearing on one side is 32 feet and on the other side 24 feet? Here the average distance is 28 feet. In the vertical column of Table I, headed with 15, the recorded distances from centres are not great enough. The nearest tabular distance to one-half of the required distance, is 13.94. This is in the horizontal column, having at its left-hand the beam, "Trenton 10½, 100." Therefore, two of these beams are required bolted together. In case 10½ inches should be too high for the required girder, four 9 inch 75 pound Phœnix beams may be substituted, as the tabular distance from centres of this beam, at 15 feet length, is 7.04 and 4 × 7.04 = 28.16 feet, the total distance from centres required.

The Distances from Centres.—In locating beams upon a floor plan, it will seldom occur that the space can be divided so that the division shall be precisely equal to the distances of the table; they will be, generally, either greater or less. The strength of the floor will be diminished just in proportion to the increase in the distances, and stronger in proportion as the distances are diminished. They ought not to be made greater.

The Formula of the Tables.—The equation from which the distances from centres were computed, is derived from

$$\delta = \frac{wl^3}{EI} \qquad (1)$$

as before stated on page 34. If, in this formula, w be the weight concentrated at the middle of the beam, and W represent a weight equally distributed over its length, then $\frac{5}{8}W$ will have an effect, in deflecting the beam, equal to that exerted by w. Therefore, equation (1), for an equally distributed load, becomes

$$\delta = \frac{\frac{5}{8}Wl^3}{EI} \qquad (2)$$

If the deflection be made proportional to the length of the beam, or $\delta = nl$; n being the decimal of an inch representing the deflection per foot of the length, and if the equally diffused weight be represented by $W = c\,l\,f$; c, the distance from centres between the beams; l, the length of the beam, and f, the total load in pounds per superficial foot of the floor; and if the load $66 + 69 + \frac{r}{3c}$ (see page 34,) be substituted for f, its symbol, equation (2) becomes

$$n = \frac{\frac{5}{8}cl^3\left(135 + \frac{r}{3c}\right)}{EI} \qquad (3)$$

From which we obtain,

$$c = \frac{nEI}{84{\cdot}375\ l^3} - \frac{r}{405} \qquad (4)$$

The value of E, as obtained from an average of the eight experiments before alluded to, is 62,000; putting this for E, and making $n = 0{\cdot}03$, the equation (4) becomes

$$c = 22{\cdot}044\,\frac{I}{l^3} - \frac{r}{405} \qquad (5)$$

which is the equation of the table, as per page 34.

Brick Arches.—In order that the arches be durable and unyielding, care is needed that they be constructed with very hard whole brick of good shape, and laid without mortar in contact with each other, and the joints all well filled with best cement grout. As to dimensions, the arch, when well built, need not be over four inches thick for spans of 7 or 8 feet, except for about a foot at each springing, where it may be eight inches thick, and here care should be taken to form the skew-back quite solid and at right angles to the line of pressure. In order to economise the height devoted to the floor, it is desirable to make the versed sine or rise of the arch small. But there is a limit less than which, if the rise be reduced, the strain will be so great as to render it liable to crush the material of which the bricks are made. Experiments have shown that this limit is not much less than one and a-quarter inches per foot of the span, and in practice it is found to be safe to make the rise one and a-half inches per foot.

In plastering upon the brick-work of the arches, the plastering is liable to become stained with rust where in contact with the iron. An excellent remedy for this, as suggested by Mr. Eidlitz, is to coat the iron thoroughly with diluted lime before allowing the plastering mortar to come in contact with it. The rust is produced by the sulphate of calcium or plaster of Paris contained in the plastering mortar, and the lime intervening prevents the contact.

Tie-Rods.—The lateral thrust exerted by the brick arches needs to be counteracted by tie-rods of iron. The arches, if made with a small rise, will differ but little from the parabolic curve, and the horizontal thrust will therefore be

$$H = \frac{ws}{8v} \qquad (6)$$

in which w, is the load: s, the span, and v, the versed sine or rise. To resist this strain the rod must be made to contain the requisite amount of metal. The ultimate tensile strength of wrought iron in small bars, is about 55,000 pounds per inch, but with only about one-sixth of this should the metal be trusted, as an oblique bearing, which careless workmanship is liable to furnish, will throw the strain out from the axis and along one side of the rod where its effect is three times as great in destroying the metal. If the safe load be 9,000 pounds per inch, then $9{,}000\ a = H$, and from equation (6) we have then,

$$9{,}000\ a = \frac{ws}{8v} \qquad (7)$$

where a, is the area in inches of the rod; w, the load in pounds, and s, the span, and v, the versed sine, both in feet. For w, we may put its equivalent, the load per foot, multiplied by the area of the floor sustained by the rod, which may be $w = c\,s\,f$; c, being the distance from centres between the rods; s, the span of the arch; and f, the weight of the brick work and the superimposed load, or 135 pounds. If the arch be made to rise $1\frac{1}{2}$ inches per foot, or one eighth of the span, then $8v = s$, and equation (7) becomes.

$$a = 0{\cdot}015\, c\, s. \qquad (8)$$

Hence, the span in feet multiplied by the decimal 0·015 and by the distance from centres at which the rods are placed, will give the area in inches of the required rod.

Example.—In beams 20 feet long with arches of 6 feet span, what is the area of the required tie rods? Here, $6 \times 0{\cdot}015 = 0{\cdot}09$. Now if there is to be but one rod, c, will equal 10 feet, therefore, $10 \times 0{\cdot}09 = 0{\cdot}9$, or 9 tenths of an inch, the area, nearly, of a rod $1\frac{1}{8}$ inch diameter. But, if two rods are desirable instead of one in the length of the beam, then $c = 6\frac{2}{3}$ and $0{\cdot}09 \times 6\frac{2}{3} = 0{\cdot}6$, or 6 tenths of an inch area which will be found in a rod of $\frac{7}{8}$ inch diameter.

Tie-rods should be placed at or near the bottom flange, and so near together that the horizontal strain between them shall not be greater than what the bottom flange of the beam shall be capable of resisting.

The following table, showing the value of I, of the formula, for each of the 29 beams, together with the elements of the beams, may be useful in simplifying computations needed in determining the deflection, load, or distances from centres, under conditions not comprehended by the table.

TABLE III.—ELEMENTS OF ROLLED IRON BEAMS.

NAME.	d = depth.	Weight.	b = breadth.	Thickness of Flanges.	Thickness of Web.	$b_{/}$	$d_{/}$	$I = bd^3 - b_{/}d_{/}^3$
Phœnix, ..	6	40	2·75	0·45	0·3	2·45	5·1	268·87
Trenton, ..	6	40	3·0	0·45	0·25	2·75	5·1	285·14
Buffalo, ..	6	40	3·0	0·45	0·25	2·75	5·1	285·14
Buffalo, ..	6	50	3·25	0·53	0·3125	2·9375	4·94	348·71
Trenton,	6	50	3·25	0·53	0·3125	2·9375	4·94	348·74
Phœnix, ..	7	60	3·25	0·56	0 4	2·85	5·88	535·56
Trenton, ..	7	56	3·5	0·54	0·3125	3·1875	5·92	536·15
Buffalo, ..	7	60	3·5	0·54	0·375	3·125	5·92	551·81
Buffalo, ..	8	65	3·4	0·55	0·4	3·0	6·9	755·27
Buffalo, ..	9	70	3·5	0·5	0·4375	3·0625	8·0	983·51
Trenton, ..	9⅛	65	3·533	0·53	0·3455	3·1875	8·065	1015·93
Phœnix, ..	9	75	3·5	0·62	0·41	3·09	7.76	1106·18
Buffalo, ..	9	90	4·0	0·64	0·5	3·5	7·72	1309·4
Trenton, ..	9⅛	84	4·0	0·66	0·4	3·6	7·805	1326·86
Phœnix, ..	9	89	4·0	0·69	0·44	3·56	7·62	1342·65
Trenton, ..	10½	100	4·5	0·73	0·375	4·125	9·04	2172·01
Buffalo, ..	10½	105	4·5	0·73	0·4375	4·0625	9·04	2202·09
Phœnix, ..	9	150	5·375	1·0	0·61	4·765	7 0	2282·95
Phœnix, ..	12	125	4·0	0·9	0·52	3·48	10·2	3219·0
Trenton, ..	12¼	124	4·5	0·78	0·5	4·0	10·69	3398·09
Buffalo, ..	12¼	125	4·5	0·8	0·5	4·0	10·65	3432·23
Trenton, ..	12¼	180	5·375	1·09	0·625	4·75	10·07	5027·32
Buffalo, ..	12¼	180	5·375	1·09	0·625	4·75	10·07	5027·32
Buffalo, ..	15	150	4·875	0·76	0·5625	4·3125	13·48	5894·5
Phœnix, ..	15	155	4·125	1·0	0·56	3·565	13·0	6085·2
Trenton, ..	15	155	5·0	0·89	0·5	4·5	13·22	6473·3
Phœnix, ..	15	200	5·3125	1·1	0·65	4·6625	12·8	8148·57
Buffalo, ..	15	200	5·375	1·12	0·625	4·75	12·76	8265·24
Trenton, ..	15	200	6·0	0·99	0·625	5·375	13·02	8378·4

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